ROCKY MOUNTAIN FLOWERS

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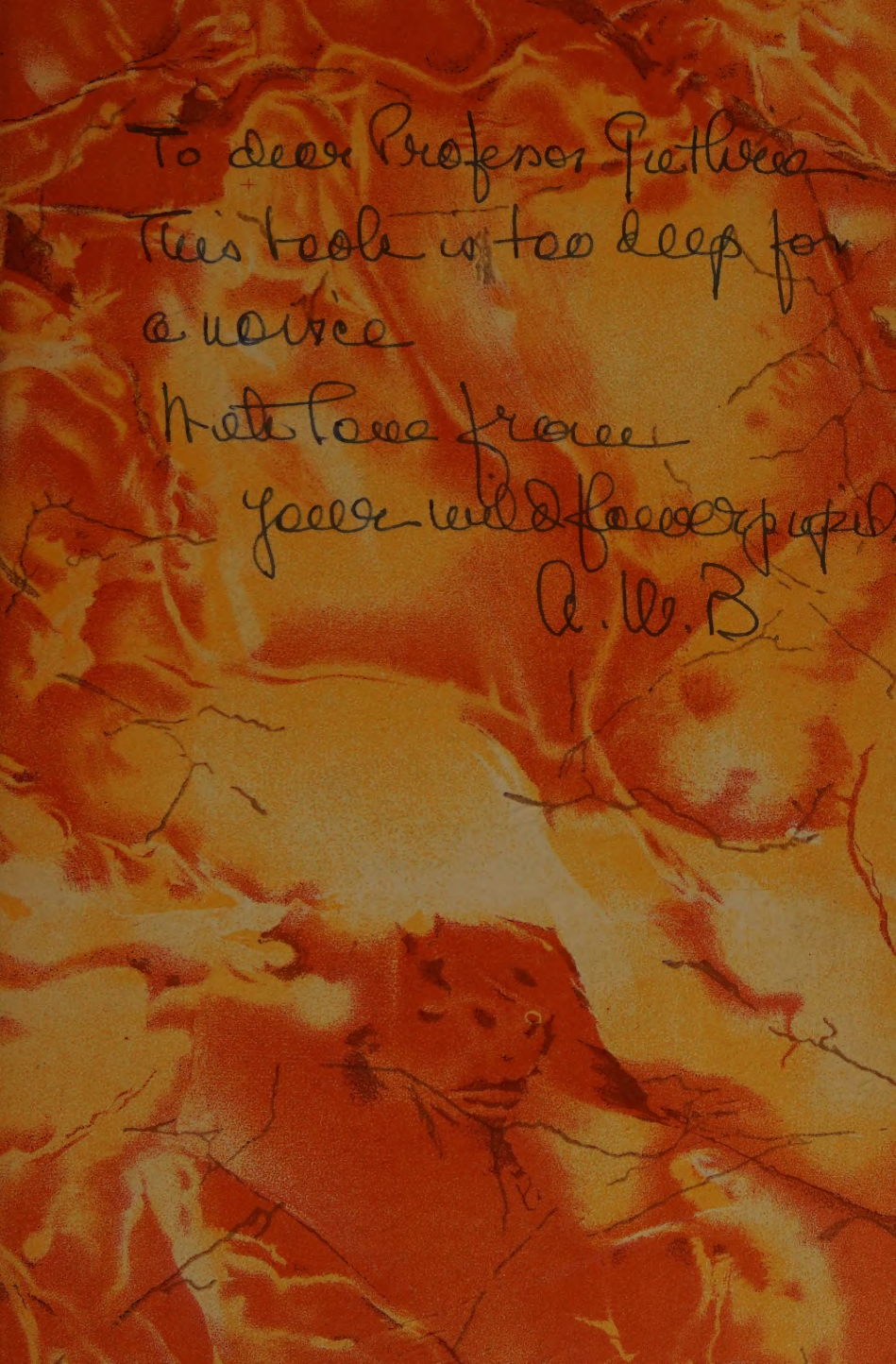
CLEMENTS AND CLEMENTS

ESTHER LEE GUTHRIE


To dear Professor Tuthill
This book is too deep for
a novice
With love from
Your wife & former pupil
A. W. B.

ROCKY MOUNTAIN FLOWERS

AN ILLUSTRATED GUIDE FOR PLANT-LOVERS AND PLANT-USERS

WITH TWENTY-SIX PLATES IN COLOR AND TWENTY-ONE PLATES IN BLACK AND WHITE

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THIRD EDITION

THE H. W. WILSON COMPANY
NEW YORK
1945

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FREDERIC E. CLEMENTS and EDITH S. CLEMENTS

Published, 1914
First Reprinting, 1917
Second Reprinting, 1920
Third Reprinting, 1928
Fourth Reprinting, 1945
Fifth Reprinting, 1949

Printed in U. S. A.

PREFACE

The present book is an endeavor to present the materials of the Rocky Mountain flora in preliminary form from the standpoint of the experimental ecologist. The latter is concerned primarily with the relationships of "species" and their subdivisions as an organic expression or measure of habitat differences, and of the competitive relations of the various formations. Whatever the taxonomic value of the numerous segregates of the last decade or two, the fact that the binomial form conceals the relationship to the original species, and that the segregate itself is based not at all or only slightly upon habitat relations, makes them of little value to the ecologist. This condition is emphasized by the extreme difficulty of their field determination and recognition. No attempt has been made to pass upon the merits of segregates as such, but similarity and relationship have been taken as determining the units used, with the conviction that the differences will appear all the more clearly when habitat and formation have been thoroughly studied experimentally. To the ecologist, it seems certain that such experimental analysis of the unit must carry with it the regular use of the trinomial, leaving binomials only for the unit as a whole, whether capable of analysis or not.

In spite of some quantitative study of the origin of new forms by adaptation to the habitat, and some statistical study of variation from habitat to habitat, during the past decade, the authors recognize clearly the tentative nature of the units employed. While the latter agree in the main with the "species" of Linné, and of Gray and the earlier American botanists, the initial test of continuous variation or discontinuous adaptation has merged a considerable number of these, and must be expected to unite still more. The questions of a species, its inherited constancy, etc., have not been raised, as this seems futile without continued experiment. The units employed may be "species" or not, but at present they mean nothing more than that the individuals or groups of individuals in a unit are more nearly related to each other than to any other group. In fact, whenever the curve of variation is continuous, it is felt that a unit is indicated, regardless of the height of the modes.

The book is a forerunner of one on the vegetation of the Rocky Mountains, which has been under way since 1899. The latter is planned not only to outline the structure and development of the vegetation, but it is hoped also that it will be of practical value to the forester and others who touch

the habitat and formation in their daily work. Such a book can be of practical use only when the units with which it deals can be recognized with some readiness and certainty. The opportunity for such recognition is materially increased by using relationship to determine the units. This is enhanced by the number of units illustrated, 175 in color and 355 in line. In addition, the illustrations make possible the recognition of a number of common plants by the plant-lover without botanical training. Furthermore, to the botanist the present book will serve to summarize the first results of the quantitative study of the origin of new forms, and to indicate the basis of the work under way in the experimental and statistical study of variation and adaptation.

The descriptions of several hundred units were written in the field from a large number of individuals, whenever possible under different conditions. It was early found that full descriptions would make the book unwieldy, and they were dropped, in so far as the units were concerned. It is felt that the generic descriptions and the full keys in the larger genera will be sufficient in practically all cases of doubt. For the same reason, no synonyms are given under the units. In fact, the value of synonyms is slight until much fuller experimental and statistical studies have been made. In general, the synonyms given by Nelson have been accepted, usually after the scrutiny of co-types. In other cases, the union of segregates is clearly indicated by the key. While the nomenclature conforms in general with the American code, no compunction has been felt in correcting improperly formed names, or in using short and significant names in preference to long ones without meaning. In the matter of measurements, the smaller units of the metric system have been used below an inch as a rule, in preference to lines or fractions.

Constant use has been made of Rydberg's "Flora of Colorado," Nelson's "New Manual of Rocky Mountain Botany," Coulter's "Manual of Rocky Mountain Botany," Britton and Brown's "Illustrated Flora," and Gray's "New Manual of Botany," as well as the original papers of Eastwood, Greene, Nelson, Rydberg and others, for which grateful acknowledgment is made. In determining the relationship of recent segregates, as well as of earlier "species," and in confirming the field and experimental results, Torrey and Gray's "Flora of North America" and Gray's "Synoptical Flora" in particular have been invaluable. The Besseyan system of classification has been employed with a few slight modifications. The sequence in the text is from buttercups to mints, then from roses to asters, and from arrowheads to orchids and grasses. The pines are placed at the end and quite frankly out of their proper position for reasons of convenience.

The color illustrations have been made in the field with few exceptions. The line drawings are largely from herbarium material. In both cases, drawings have been made natural size throughout, except in case of small parts such as fruits, spikelets, perigynia, etc.

The range of the book is essentially that of Coulter-Nelson's "Manual," namely, Colorado, Wyoming, most of Montana, Northern New Mexico, Eastern Utah, and Western North and South Dakota, Nebraska and Kansas. The layman will find the book useful over a much wider area, since the majority of the species in color occur from the Canadian Rockies to California or Arizona.

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EDITH S. CLEMENTS.

Minnehaha-on-Ruxton,
Manitou, Colorado,
July 22, 1913.

PREFACE TO THIRD EDITION

In addition to making a number of corrections in the keys, the printing of a new edition furnishes an opportunity to replace the flower chart by means of a later one in color. The latter provides a much more adequate representation of floral relationships, in spite of the absence of the formulae. It is now discussed in much detail in a separate book, "Flower Families and Ancestors," and for this reason the part of the Introduction dealing with the flower chart has been omitted from the present edition.

FREDERIC E. CLEMENTS,
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Mission Canyon,
Santa Barbara,
January 20, 1928.

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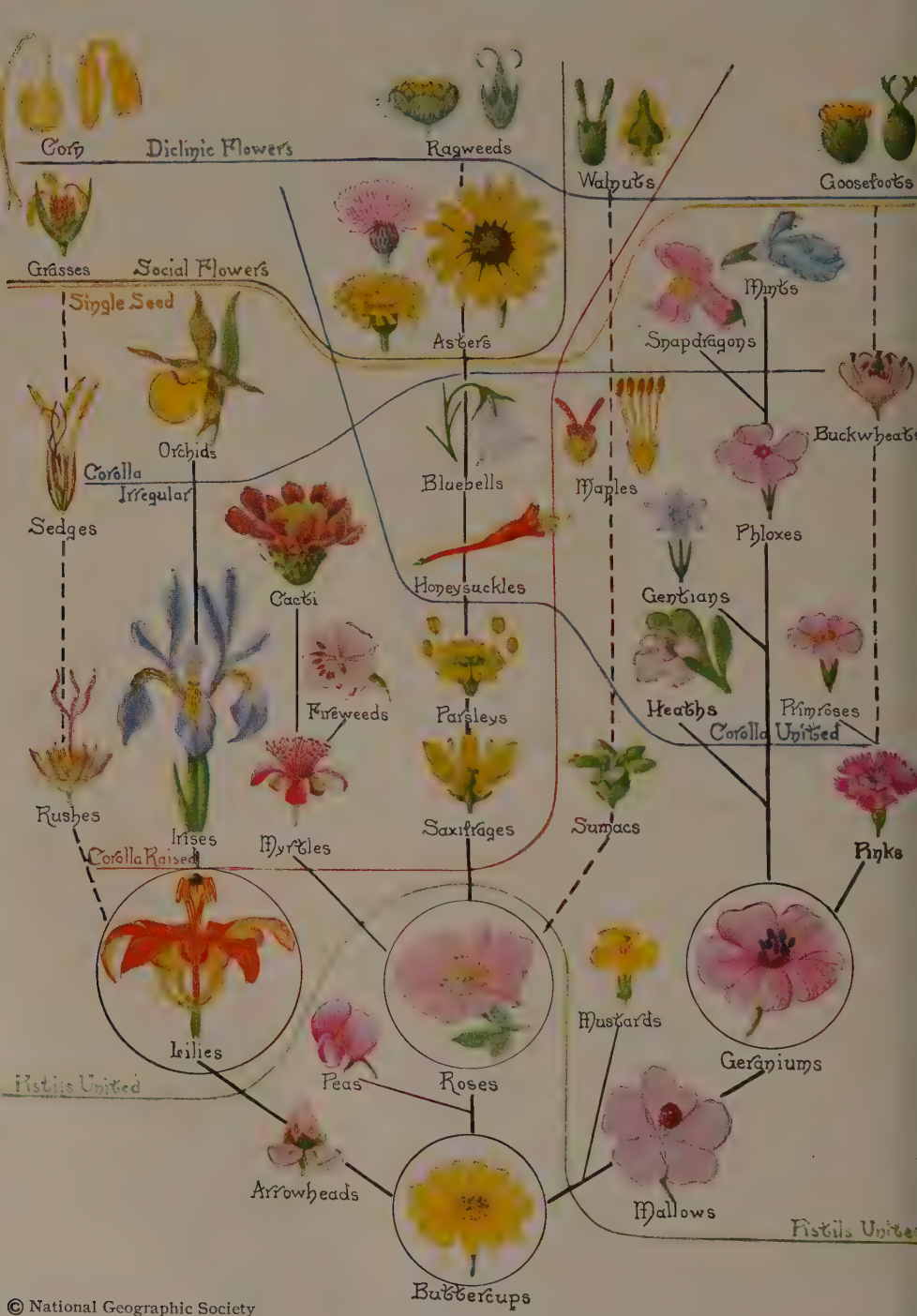

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FLOWER CHART

INTRODUCTION

THE FLOWER CHART

The flower chart expresses in concise and graphic form the general lines of evolution from the ancestral buttercups, and hence indicates the origin and relationship of the various groups. The most important points in it are the initial order, the buttercups, the three great centers, geraniums, roses and lilies, and the six highest orders, the mints, asters, and orchids among showy flowers, and the goosefoots, walnuts, and grasses among the less conspicuous ones. This difference is due to the emphasis placed upon the corolla in insect-pollination, and upon stamens and pistil with the consequent loss of corolla and often of calyx also in the wind-pollinated flowers. Each of the three centers, geraniums, roses and lilies, has responded to both types of pollination, and the most important feature of the flower chart is to be found in the parallel lines of evolution from them. Although arising from a common type of flower in the case of each pair, the two lines undergo a strikingly different development under the respective influence of insects and winds to produce very dissimilar results. The solid black lines indicate evolution under the control of insect-pollination, the broken ones under that of wind-pollination.

The cross-lines in color mark the region in which the important changes in flower structure occur. The first four of these concern insect-pollinated flowers, three of them dealing with the corolla. These changes took place at different times in the three lines and hence cross the black lines at different points. The last three changes represent later advances and affect wind-pollinated as well as insect-pollinated lines.

In the present book the flower chart is chiefly valuable in showing the lines of evolution and relationship, and consequently in giving a clue to the arrangement of families and orders in the text. Its greatest value lies in making it possible to trace the effect of insects and wind upon the evolution of the flower step by step, but this can only be done by means of charts with formulae, which express the structure of each group in detail. This requires much more space than an introduction affords and has been made the chief theme of a separate book, "Flower Families and Ancestors." Probably the next most important use of the chart is to serve as a ready and graphic key to orders and families and to make it possible to obtain such a mastery of family types as to render family keys unnecessary. Both of these values are discussed in much detail in the book mentioned.

Names of Plants

The name of a plant consists as a rule of two parts or words, as for example, *Aquilegia coerulea, Calochortus gunnisoni, Lilium philadelphicum,* etc. The first word indicates the *genus,* and is always capitalized. The second word indicates the *species,* or kind, and is never capitalized in the latest usage. The meaning of the terms *genus* (plural, *genera*) and *species* (plural, *species*) may be clearly illustrated by the columbines and violets. The blue columbine and the red columbine are different kinds or species of the *genus* of columbines, *Aquilegia,* each one designated by a species name, *coerulea* and *canadensis,* respectively. The blue violet, yellow violet and white violet are different species of the violet genus *Viola;* they are designated by the respective species names, *pedatifida, biflora,* and *blanda.* Genera which are related to each other are placed in the same family, for example, the columbines, larkspurs, monkshoods, anemones and buttercups in the buttercup family, *Ranunculaceae;* the asters, sunflowers, goldenrods, coneflowers, daisies, black-eyed Susans, etc., in the aster family, *Asteraceae.* The ending *-aceae,* which is always used to denote a family, is the feminine plural of the Latin suffix, *-aceus,* meaning *like* or *related to.* The family name, *Asteraceae,* is really an adjective agreeing with *plantae,* plants, and meaning "plants related to the aster." Related families are themselves grouped into orders which also bear a distinctive ending, e. g., *Asterales, Ranales.* This ending is likewise in the feminine plural, and the meaning of the name is "plant families related to the aster family," etc. Orders are further arranged into larger groups, such as *Monocotyledons,* flowering plants with a single seed-leaf, scattered bundles in the stem, parallel-veined leaves, and a flower-plan of 3, and *Dicotyledons,* with 2 seed-leaves, ringed bundles, netted-veined leaves and a flower-plan of 5 or 4. These two groups form the *Angiosperms,* with closed pistils and usually with sepals and petals, which are contrasted with the *Gymnosperms,* with open pistils and no sepals or petals.

How to Use the Key

The method of finding the name of a plant by means of the key to families (page xv) may be illustrated by an example. In the case of the Mariposa Lily, which has 3 petals and 3 sepals, the first choice is made between "I. Petals present" and "II. Petals absent." Since the petals are present, the second choice is ignored, and the next decision rests between "1. Flowers in heads" and "2. Flowers single or in clusters." As the flowers are single, the latter is chosen, and the next choice lies between "a. Petals separate" and "b. Petals united." The petals are found to be

separate, and the next choice is between the subdivisions "(1) Petals 1-3," "(2) Petals 4," and "(3) Petals 5 or more." The plant in hand falls under the first, where the decision rests between "(a) Petal 1," "(b) Petals 2" and "(c) Petals 3." The latter is the proper number, and the next choice is between "x. Sepals green, unlike the petals," and "y. Sepals and petals more or less alike in color." Beneath the former are two possibilities, "(x) Leaves grass-like; flower withering in a few hours," and "(y) Leaves not grass-like; flower persistent." While the leaves are somewhat grass-like, the flower is persistent, and the choice must fall upon "(y)." Under the latter, the decision lies between "m. Pistils 6-many, distinct; water-plants," and "n. Pistil 1, compound, with 3 cells; land-plants." A cross-section of the single pistil shows that it has 3 cells, and the plant is clearly a land-plant. It is thus seen to belong to the Lily Family, Liliaceae, page 304. The next step is to read the family description in order to see that the plant is in essential agreement, and then it is traced through the key to genera in the manner already indicated. The first choice lies between "1. Styles distinct" and "2. Styles united." Under the latter, the choice is between "a. Flowers axillary, solitary or 1-few in a cluster" and "b. Flowers terminal." The latter is true, and the next choice rests between "(1) Flowers on a leafy stem," and "(2) Plants stemless." Under the former, the color of the flower determines upon "(a) Flowers white or whitish to lilac" instead of "(b) Flowers yellow to orange or purple." Under "(a)," the choice falls upon "y" rather than "x," since the flowers are usually 1-2. The next choice is between "(x) Flowers nodding; leaves ovate to lance-oblong" and "(y) Flowers erect; leaves linear, grass-like." The latter is chosen, and the final decision lies between "m. Flowers 1-3 in. wide; petals fringed at base" and "n. Flowers 1-2 cm. wide; petals not fringed." The name of the genus of the Mariposa Lily is thus found to be "Calochortus," and the name of the species is found by turning to page 308. The plant should first be compared with the description, after which the species is obtained by deciding between "1" and "2." Since the gland is oblong and transverse, and the anthers acute, the species concerned is "Calochortus gunnisoni."

KEY TO FAMILIES

I. Petals present
  1. Flowers in heads, as in the aster and clover
    a. Ovary superior — TRIFOLIUM IN FABACEAE 186
    b. Ovary inferior
      (1) Petals separate; style simple; upper leaves in a whorl of 4-6 — CORNACEAE 222
      (2) Petals united; style 2-cleft; leaves rarely whorled — ASTERACEAE 243
  2. Flowers single or in clusters
    a. Petals separate
      (1) Petals 1-3
        (a) Petal 1; stamens 10; shrub — AMORPHA IN FABACEAE 170
        (b) Petals 2
          x. Ovary superior, smooth
            (x) Water plants; stamens 2-3 — ELATINACEAE 42
            (y) Land plants; stamen 1 — CALYPTRIDIUM IN PORTULACACEAE 49
          y. Ovary inferior, bristly-hairy — CIRCAEA IN ONAGRACEAE 201
        (c) Petals 3
          x. Sepals green, unlike the petals
            (x) Leaves grass-like; flower withering in a few hours — COMMELINACEAE 304
            (y) Leaves usually broad; flower persistent
              m. Pistils 6-many, distinct; water plants — ALISMACEAE 299
              n. Pistil 1, compound, with 3 cells; land plants — LILIACEAE 304
          y. Sepals and petals more or less alike in color
            (x) Flowers regular

m. Ovary superior
(m) Stamens and pistils in different flowers; plants with tendrils — SMILACACEAE 312
(n) Stamens and pistils usually in the same flower
r. Sepals and petals greenish, tiny
(r) Ovaries 3-6, separating, at least when ripe — JUNCAGINACEAE 303
(s) Ovary 1, of 3 carpels — JUNCACEAE 312
s. Sepals and petals typically colored
(r) Stamens 3 — PONTEDERIACEAE 314
(s) Stamens 6 — LILIACEAE 304
n. Ovary inferior
(m) Flowers perfect; stamens 3; plants terrestrial — IRIDACEAE 316
(n) Flowers imperfect; stamens 3-9; plants aquatic — HYDROCHARITACEAE 315

(y) Flowers irregular
m. Stamens many — RANUNCULACEAE 1
n. Stamens 1-8
(m) Sepals 3; petals 3, 1 large and lip-like — ORCHIDACEAE 316
(n) Sepals 5, 2 petal-like; petals 3 — POLYGALACEAE 30

(2) Petals 4
(a) Flowers regular
x. Stamens 3-5
(x) Leaves of 3 leaflets — RUTACEAE 40
(y) Leaves simple
m. Shrubs
(m) Ovary superior
r. Leaves opposite — CELASTRACEAE 211
s. Leaves alternate — LEDUM IN ERICACEAE 86
(n) Ovary inferior — CORNACEAE 222
n. Herbs
(m) Pistils separate — CRASSULACEAE 188
(n) Pistils united

r. Stamens 4-5 — Saxifragaceae 191
s. Stamens 3 — Portulacaceae 48
y. Stamens 6 — Brassicaceae 16
z. Stamens more than 6
(x) Leaves compound
m. Style 5-lobed; leaves pinnate — Limnanthaceae 37
n. Style entire or 2-lobed
(m) Leaves digitate, of 3-5 leaflets — Capparidaceae 13
(n) Leaves 2-3-ternate — Actaea in Ranunculaceae 2
(y) Leaves simple
m. Sepals 2; leaves fleshy — Portulacaceae 48
n. Sepals 4-5; leaves not fleshy
(m) Shrubs
r. Flowers white
(r) Leaves alternate, evergreen — Ledum in Ericaceae 86
(s) Leaves opposite, not evergreen — Saxifragaceae 191
s. Flowers purplish-yellow; leaves linear, strong-scented — Thamnosma in Rutaceae 40
(n) Herbs
r. Pistils superior
(r) Stamens 8 — Saxifragaceae 191
(s) Stamens many — Papaveraceae 9
s. Pistil inferior; stamens 8 — Onagraceae 199
(b) Flowers irregular
x. Flowers spurred or hooded; leaves deeply cut or compound
(x) Stamens many; pistils 2-3 — Ranunculaceae 1
(y) Stamens 6; pistil 1 — Fumariaceae 12
y. Flowers not spurred; leaves simple — Onagraceae 199
(3) Petals 5 or more
(a) Flowers regular
x. Pistils simple, 1-many
(x) Pistils few-many
m. Stamens and petals coming off with the calyx — Rosaceae 150

n. Stamens and petals entirely free from the calyx — RANUNCULACEAE 1

(y) Pistil 1

m. Stamens 5-12

(m) Petals 6; shrubs — BERBERIDACEAE 8

(n) Petals 5; herbs — MIMOSACEAE 167

n. Stamens many

(m) Woody plants — PRUNACEAE 165

(n) Herbs — RANUNCULACEAE 1

y. Pistil compound

(x) Woody plants

m. Vines with tendrils — VITACEAE 211

n. Trees or shrubs

(m) Leaves simple

r. Style 1 — ERICACEAE 83

s. Styles 2

(r) Ovary superior

h. Ovary deeply 2-divided, winged — ACERACEAE 217

i. Fruit a 1-celled capsule — FRANKENIACEAE 42

(s) Ovary inferior; woody plants — SAXIFRAGACEAE 191

t. Styles 3-5

(r) Flowers white or pink — MALACEAE 163

(s) Flowers greenish — RHAMNACEAE 212

(n) Leaves compound

r. Leaves opposite, pinnate — ZYGOPHYLLACEAE 41

s. Leaves alternate

(r) Flowers greenish; plants often poisonous to the touch — ANACARDIACEAE 220

(s) Flowers white or whitish

h. Leaflets 3; fruit winged — RUTACEAE 40

i. Leaflets many; fruit fleshy — MALACEAE 163

(y) Herbs

m. Plants fleshy

(m) Plants leafless, spiny; petals many — CACTACEAE 207

(n) Stems leafy, not spiny; petals 4-5 — CRASSULACEAE 188

n. Plants not fleshy
(m) Ovary many-celled
r. Stamen filaments united into a tube — MALVACEAE 31
s. Stamen filaments not united into a tube
(r) Aquatic plants with simple floating leaves — NYMPHAEACEAE 9
(s) Land plants with pinnate leaves — ZYGOPHYLLACEAE 41
(n) Ovary 5-celled
r. Ovary superior
(r) Leaves simple or none
h. Leaves none; plants not green — MONOTROPACEAE 82
i. Leaves present; plants green
(h) Leaves evergreen; petals persistent — PIROLACEAE 78
(i) Leaves not evergreen; petals falling in a few hours — LINACEAE 40
(s) Leaves deeply cut or compound
h. Leaves deeply cut — GERANIACEAE 37
i. Leaves of 3 leaflets — OXALIDACEAE 39
s. Ovary inferior — ARALIACEAE 222
(o) Ovary 1-4-celled
r. Ovary 2-4-celled
(r) Ovary superior
h. Leaves simple
(h) Ovary 2-celled — SAXIFRAGACEAE 191
(i) Ovary 3-celled — EUPHORBIACEAE 34
i. Leaves compound
(h) Leaves of 3 leaflets — MENYANTHACEAE 99
(i) Leaves pinnate — LIMNANTHACEAE 37
(s) Ovary inferior
h. Calyx tube not grown to the ovary; capsule many-seeded — LYTHRACEAE 199

i. Calyx tube grown to the ovary; fruit 2-seeded — Apiaceae 223

s. Ovary 1-celled

(r) Sepals 5

h. Ovary superior

(h) Styles 2

k. Pistils 2 at top, opening on the inner face — Saxifragaceae 191

l. Capsule opening by 4 teeth — Caryophyllaceae 43

(i) Styles 3-5

k. Stamens usually twice as many as the petals — Caryophyllaceae 43

l. Stamens numerous — Hypericaceae 42

i. Ovary inferior; stamens many — Loasaceae 209

(s) Sepals 2

h. Stamens 3-20 — Portulacaceae 48

i. Stamens many — Papaveraceae 9

(b) Flowers irregular

x. Flowers spurred or hooded

(x) Sepals green — Violaceae 29

(y) Sepals petal-like — Ranunculaceae 1

y. Flowers not spurred

(x) Petals of 3 shapes — Fabaceae 168

(y) Petals somewhat irregular — Cassiaceae 167

b. Petals united

(1) Ovary superior

(a) Low, usually evergreen shrubs — Ericaceae 83

(b) Herbs

x. Ovary 1-celled

(x) Carpels 2

m. Leaves entire, opposite

(m) Flowers irregular — Martyniaceae 141

(n) Flowers regular — Gentianaceae 93

n. Leaves toothed, lobed or compound

(m) Petals very hairy on the upper face — MENYANTHACEAE 99

(n) Petals smooth

r. Flowers regular; terrestrial — HYDROPHYLLACEAE 116

s. Flowers irregular; aquatic — PINGUICULACEAE 139

(y) Carpels 5 — PRIMULACEAE 88

y. Ovary 2-celled, 2-divided or 4-lobed

(x) Ovary 2-celled or 2-divided

m. Leafless herbs; plants not green

(m) Stems twining; flowers regular — CUSCUTACEAE 109

(n) Stems not twining; flowers irregular — OROBANCHACEAE 140

n. Leafy herbs

(m) Stamens 5

r. Ovary 2-lobed or pistils 2 and separate

(r) Stamens distinct, around a crown — ASCLEPIADACEAE 101

(s) Stamens united; crown none — APOCYNACEAE 100

s. Ovary 1, 2-celled, not 2-lobed

(r) Seeds 2-several; mostly climbing or trailing — CONVOLVULACEAE 108

(s) Seeds many — SOLANACEAE 110

(n) Stamens 4

r. Corolla brightly colored, the lobes usually 5

(r) Fruit a 2-celled capsule — SCROPHULARIACEAE 125

(s) Fruit 2 or 4 1-seeded nutlets — VERBENACEAE 142

s. Corolla papery, the lobes 4 — PLANTAGINACEAE 92

(y) Ovary 4-lobed or divided

m. Flowers usually irregular; leaves opposite — MENTHACEAE

n. Flowers usually regular; leaves mostly alternate — Boraginaceae 118

z. Ovary 3-5-celled

m. Stems green, leafy

(m) Stems trailing or climbing — Convolvulaceae 108

(n) Stems not trailing or climbing — Polemoniaceae 103

n. Stems not green, the leaves reduced to scales — Monotropaceae 82

(2) Ovary inferior

(a) Woody plants

x. Stamens 5 — Caprifoliaceae 237

y. Stamens 8-10 — Vacciniaceae 87

(b) Herbs

x. Stamens 3

(x) Stems erect; fruit with a feathery pappus — Valerianaceae 243

(y) Stems trailing or climbing; fruit fleshy — Cucurbitaceae 210

y. Stamens 4-5

(x) Sap milky as a rule; herbs with large flowers — Campanulaceae 241

(y) Sap not milky

m. Shrubs — Caprifoliaceae 237

n. Herbs — Rubiaceae 237

z. Stamens 8-12 — Adoxaceae 241

II. Petals absent

1. Sepals present, rarely very minute

a. Woody plants

(1) Vines; petals falling quickly — Vitaceae 211

(2) Shrubs or trees

(a) Flowers in catkins, at least the staminate — Fagaceae 221

(b) Flowers not in catkins

x. Style 1; stigma 1 or slightly 2-cleft

(x) Trees with compound leaves — Oleaceae 99

(y) Shrubs with simple leaves

m. Leaves silvery-scurfy — Elaeagnaceae 213

n. Leaves green — Rosaceae 150

y. Styles or long sessile stigmas 2

(x) Leaves deeply cut or compound — ACERACEAE 217
(y) Leaves simple, not deeply cut — URTICACEAE 33

b. Herbs
(1) Nearly colorless herbs, parasitic on trees — LORANTHACEAE 216
(2) Plants grass-like, sometimes leafless; sepals 6
(a) Ovaries 3-6, separating at least when ripe — JUNCAGINACEAE 303
(b) Ovary 1, of 3 carpels — JUNCACEAE 312
(3) Plants with broad green leaves
(a) Pistils several-many — RANUNCULACEAE 1
(b) Pistil 1, at least the ovary
x. Stamens as many as the sepals or fewer
(x) Ovary superior
m. Flowers and bracts papery, not withering — AMARANTACEAE 67
n. Flowers and bracts not papery and not persistent
(m) Flowers in small involucres, or the stems with papery sheaths at the joints — POLYGONACEAE 51
(n) Flowers not in involucres, and stems without papery sheaths
r. Style and stigma 1, or 2; if the latter, the leaves digitate or digitately lobed — URTICACEAE 33
s. Styles 2-5, the leaves simple or pinnatifid
(r) Styles 2-3; leaves typically alternate — CHENOPODIACEAE 59
(s) Styles 3-5; leaves opposite — AIZOACEAE 50
(y) Ovary half-inferior; style and stigma 1 — SANTALACEAE 216
(z) Ovary inferior
m. Leaves alternate — APIACEAE 223
n. Leaves opposite — NYCTAGINACEAE 68
y. Stamens more numerous than the sepals
(x) Ovary superior
m. Sepals 4
(m) Stamens 6; style and stigma 1 — BRASSICACEAE 16

(n) Stamens usually 8; style and stigma 2 — Saxifragaceae 191

n. Sepals 5

(m) Stamens numerous; styles 3 — Euphorbiaceae 34

(n) Stamens 6-8; stigmas 2-3 — Polygonaceae 51

(y) Ovary inferior; aquatic herbs — Gunneraceae 206

2. Sepals absent, or occasionally very minute

a. Woody plants

(1) Leaves scale-like or needle-like, usually evergreen

(a) Stems jointed, low and shrubby; scales papery — Gnetaceae 369

(b) Stems not jointed, mostly trees; leaves green, usually needle-like — Pinaceae 364

(2) Leaves not scale-like or needle-like, deciduous

(a) Leaves simple, alternate

x. Fruit with many hairy seeds; flowers dioecious — Salicaceae 72

y. Fruit 1-seeded; flowers usually monoecious — Betulaceae 220

(b) Leaves compound, opposite — Oleaceae 99

b. Herbs

(1) Flowers in heads, surrounded by 5 petal-like glands — Euphorbiaceae 34

(2) Flowers not in heads with petal-like glands

(a) Flowers in spikelets with papery scales; leaves grass-like

x. Flower enclosed in 2 scales; stem hollow, round — Poaceae 335

y. Flower with a single scale; stems solid, mostly triangular — Cyperaceae 324

(b) Flowers not in spikelets with papery scales

x. Plants small floating leaf-like disks — Lemnaceae 315

y. Plants with leafy stems

(x) Leaves in whorls of 6-8 — Ceratophyllaceae 9

(y) Leaves not in whorls of 6-8

m. Leaves parallel-veined

(m) Some or all of the leaves submerged — Naiadaceae 301

(n) Leaves usually aerial, occasionally floating

r. Flowers in terminal cylindric spikes — Typhaceae 300

s. Flowers in lateral heads — Sparganiaceae 301

n. Leaves netted-veined — Callitrichaceae 47

Plate 1

BUTTERCUP FAMILY

1 Monkshood, Aconite: Aconitum columbianum
2 Blue Columbine: Aquilegia coerulea
3 Red Columbine: Aquilegia canadensis
4 Blue Larkspur: Delphinium scopulorum

RANALES BUTTERCUP ORDER

RANUNCULACEAE BUTTERCUP FAMILY

Sepals 3-15, separate, often petal-like, petals 3-20, or none, separate, stamens many, pistils many, few or none, the ovary 1-celled, fruit an achene, follicle or berry, 1-many-seeded; flowers regular, sometimes irregular, usually clustered; annual or perennial herbs, rarely woody shrubs or climbers, with simple or compound leaves.

I. Flowers regular

1. Petals and sepals both clearly present
   - a. Petals spurred — AQUILEGIA
   - b. Petals not spurred
     - (1) Pistils several to many in each flower
       - (a) Flowers greenish, tiny — MYOSURUS
       - (b) Flowers yellow or white — RANUNCULUS
     - (2) Pistil 1 — ACTAEA

2. Petals lacking, sepals often petal-like
   - a. Sepals petal-like, white or colored
     - (1) Leaves opposite; often climbing or trailing — CLEMATIS
     - (2) Leaves alternate
       - (a) Stem with a whorl of leaves, i. e., an involucre, below the flower
         - x. Flowers 1-4 cm. wide; styles short, not plumy — ANEMONE
         - y. Flowers 4-8 cm. wide; styles long and plumy — PULSATILLA
       - (b) Stems leafy, without an involucre
         - x. Leaves simple, toothed — CALTHA
         - y. Leaves deeply cleft or divided — TROLLIUS
   - b. Sepals green or greenish-white, small — THALICTRUM

II. Flowers irregular

1. Upper sepal spurred — DELPHINIUM
2. Upper sepal hood- or helmet-like — ACONITUM

ACONÍTUM Linné 1753 ACONITE, MONKSHOOD

(Gr. *akoniton,* monkshood, perhaps from its mountain habit.)

Pl. 1, fig. 1.

Sepals 5, petal-like, blue to yellowish-white, the upper larger, helmet- or hood-shaped; petals 2-5, small or minute when 2, hidden in the helmet; stamens many, usually about 30, pistils 1-5, usually 3, fruit a several-seeded follicle; flowers irregular, in a raceme or panicle; leaves 3-7-cleft or divided; poisonous perennials.

Flowers 2.5-3.5 cm. long; sepals of 3 kinds; petals 2, hidden — *A. columbiánum*

ACTAÉA Linné 1753 BANEBERRY

(Gr. *aktea,* elder, perhaps from resemblance of the leaves)

Sepals 4-5, petal-like, white, falling as the flower opens, petals 4-10, small, white, spatulate, stamens many, pistil 1, the ovary 1-celled with sessile stigma, fruit a poisonous berry; flowers regular, in a spike-like raceme; leaves thrice compound, leaflets coarsely toothed or lobed; perennial.

Berries red, white or purple-black — *A. spicáta*

ANEMÓNE Linné 1753 ANEMONE, WINDFLOWER

(Gr. *anemone,* shaken by the wind, hence windflower)

Pl. 3, fig. 1.

Sepals 4-20, petal-like, white, pink, red or purple, separate, petals none, stamens many, pistils many, fruits 1-seeded usually hairy achenes in a dense head or spike; flowers regular, single or few in a cluster; leaves usually 3-5-divided, the upper usually sessile and forming an involucre below the flower; perennial.

1. Fruits many, woolly
   a. Stem branched; flowers 2-several
      (1) Head of fruit cylindric — *A. cylíndrica*
      (2) Head of fruit round or nearly so — *A. multífida*
   b. Stem not branched; flowers single
      (1) Sepals usually 10 or more — *A. decapétala*
      (2) Sepals 5-6 — *A. parviflóra*
2. Fruits usually less than 25, somewhat hairy, or smooth
   a. Fruits somewhat hairy; flowers white or pinkish

(1) Stem branched, hairy; flowers 3-6 cm. wide — *A. dichótoma*
(2) Stem simple, smooth; flowers 2-3 cm. wide — *A. nemorósa*
b. Fruits smooth; flowers usually yellowish — *A. narcissiflóra*

Aquilégia Linné 1753 Columbine

(Lat. *aquilegia,* perhaps from Lat. *aquila,* eagle, in allusion to the resemblance of the spurs to an eagle's talons)

Pl. 1, fig. 2-3.

Sepals 5, petal-like, petals 5, spurred, red, yellow, blue or white, stamens many, some often petal-like or scale-like, pistils 5, the ovules many, 2-rowed, fruit a follicle; flowers regular, single or in clusters; leaves usually twice ternately compound; perennial.

1. Flowers red to yellow
   a. Flowers red and yellow; spur 1-2 cm. long — *A. canadénsis*
   b. Flowers yellow; spur 3-6 cm. long — *A. chrysántha*
2. Flowers blue, rarely white
   a. Flower stalk leafy
      (1) Flower large, 5-6 cm. wide — *A. caerúlea*
      (2) Flower small, 2-3 cm. wide — *A. brevístyla*
   b. Flower stalk leafless; leaflets crowded — *A. jónesi*

Cáltha Linné 1753 Marsh Marigold

(The Latin name of the true marigold)

Sepals 6-10, petal-like, white or yellow, falling away, petals none, stamens many, pistils 3-10, fruit a beaked many-seeded follicle; flowers regular, mostly single, or few in a cluster; leaves simple, elliptic to rounded; fleshy perennials.

Leaves heart-shaped at base, wavy-toothed; flowers 2-5 cm. wide — *C. leptosépala*

Clématis Linné 1753 Clematis, Virgin's Bower

(Gr. *klematis,* a climbing plant)

(Atragene Linné)

Pl. 3, fig. 2.

Sepals 4-5, petal-like, white to purple, petals 0, or merely broadened stamens, stamens many, the outer often like tiny petals, pistils many, fruit

PLATE 3

BUTTERCUPS—WATER LILIES

BUTTERCUP FAMILY

1. Anemone multifida: Windflower
2. Clematis alpina. Virgin's Bower
3. Ranunculus cymbalaria: Buttercup
5. Pulsatilla hirsutissima: Pasque Flower
6. Ranunculus macauleyi: Alpine Buttercup

WATER LILY FAMILY

4. Nymphæa polysepala: Water Lily

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an achene with a long plumy style; flowers regular, solitary or clustered; leaves opposite, usually pinnate or pinnatifid, sometimes entire; stems perennial, climbing by the leaf stalks, trailing or erect.

1. Stems climbing; flowers small, white — *C. ligusticifólia*
2. Stems trailing or erect; flowers large, blue to violet
   a. Stems trailing, rarely climbing; leaves ternate
      (1) Leaves 3-foliate — *C. occidentális*
      (2) Leaves twice-ternate — *C. alpína*
   b. Stems erect; leaves pinnatifid — *C. douglási*

Delphínium Linné 1753 Larkspur

(Gr. *delphinion,* larkspur, from *delphis,* dolphin, perhaps in allusion to the irregular form)

Pl. 1, fig. 4

Sepals 5, petal-like, the back one spurred, blue, white or red. petals 2 or 4, the back ones spurred, the lateral small or lacking, stamens many, pistils 1-several, usually 3, fruit a many-seeded follicle; flowers irregular, in a raceme, often spike-like, or sometimes in a panicle; leaves palmately cleft or divided; stems from a caudex or from tuberous roots; ours poisonous perennials.

1. Stem and leaves, or at least the flower cluster, glandular and sticky — *D. occidentále*
2. Stem and leaves not sticky glandular
   a. Roots thickened, more or less tuberous; plants usually .5-3 ft. high.
      (1) Stems mostly closely and densely gray-hairy; flowers often whitish — *D. caroliniánum*
      (2) Stems smooth or with loose spreading hairs above — *D. menziési*
   b. Roots woody and branched, scarcely tuberous; plants 3-8 ft. high — *D. scopulórum*

Myosúrus Linné 1753 Mouse-tail

(Gr. *myouros,* mouse-tail, from the tail-like spike of fruits)

Sepals 5, somewhat petal-like, spurred, petals 5, tiny, or none, stamens many, pistils many, fruits achenes, forming a spike; flowers regular, single, on leafless stalks; leaves basal, linear, entire; low annuals.

1. Fruiting spike bristly from the long-beaked achenes — *M. aristátus*
2. Fruiting spike smooth, the achenes short-beaked — *M. minimus*

PULSATÍLLA Adanson 1763 PASQUE FLOWER

(Lat. diminutive of *pulsatus*, shaken, hence windflower)

Pl. 3, fig. 5.

Sepals 5-7, usually 6, petal-like, blue, purple or whitish, petals none, stamens many, pistils many, fruits 1-seeded achenes, the styles long and plumy in fruit; flowers regular, single; leaves 3-divided and cleft; perennial.

Flowers cup-shaped, then expanded; fruiting styles 2.5-4 cm. long — *P. hirsutíssima*

RANÚNCULUS Linne 1753 BUTTERCUP, CROWFOOT

(Lat. *rana*, frog, *-unculus*, little, from the amphibious habitat of some)

Pl. 3, fig. 3, 6.

Sepals, 5, green or petal-like, petals regularly 5, yellow or white, rarely red, with a nectary at the base, stamens many, pistils many, achenes compressed, rarely cylindric, 1-seeded; flowers regular, single or somewhat racemose; leaves various, simple and entire to lobed and dissected, or compound; annual or perennial.

I. Petals yellow or yellowish; land plants, rarely submerged
  1. Leaves simple, entire to divided or dissected
    a. Leaves entire, at most finely toothed — *R. flámmula*
      (1) Plants erect — *alismifólius*
      (2) Plants creeping — *réptans*
    b. Leaves, or at least some of them, coarsely toothed, lobed or divided
      (1) Achenes nerved lengthwise — *R. cymbalária*
      (2) Achenes not nerved lengthwise
        (a) Some of the leaves entire — *R. ellípticus*
        (b) All the leaves lobed or cleft, or at least coarsely toothed
          x. Pedicels and sepals densely brown-hairy — *R. macaúleyi*
          y. Pedicels and sepals not densely brown-hairy

(x) Plants aquatic, or the stems creeping and rooting in the mud
m. Leaves 3-lobed, the lobes often notched — *R. nátans*
n. Leaves 3-5-divided, the segments deeply cleft into oblong or linear divisions — *R. multífidus*
(y) Plants not aquatic or creeping and rooting in the mud
m. Achenes round, swollen, without a distinct margin
r. Petals large to medium, much longer than the sepals
(r) All leaves deeply cleft or divided
h. Leaves 2-3-ternately divided — *R. adóneus*
i. Leaves 3-7-cleft or -divided — *R. exímius*
(s) Some of the basal leaves only coarsely toothed
h. Achenes smooth
(h) Plant smooth — *R. nivális*
(i) Plant hairy — *R. ovális*
i. Achenes hairy — *R. áffinis*
s. Petals small, scarcely longer than the sepals
(r) Some of the basal leaves merely coarsely toothed — *R. abortívus*
(s) All the basal leaves lobed or divided — *R. scelerátus*
n. Achenes flattened and with a distinct margin
r. Beak of the achene hook-like
(r) Petals 3-5 mm. long — *R. douglási*
(s) Petals 6-12 mm. long — *R. acrifórmis*
s. Beak of the achene straight or nearly so
(r) Petals longer than the sepals; head of achenes globose
h. Beak about as long as achene — *R. máximus*

i. Beak about one-third as long as achene — *R. macóuni*
(s) Petals not longer than the sepals; head oblong — *R. pennsilvánicus*
2. Leaves compound — *R. ranunculínus*
II. Petals white; more or less submersed aquatics — *R. aquátilis*

THALÍCTRUM Linné 1753 MEADOW RUE
(The Greek name)

Sepals 4-5, greenish-white, petals none, stamens many, pistils usually many, achenes more or less swollen, 1-seeded; flowers perfect, or imperfect, usually dioecious, in a panicle or raceme; leaves thrice compound; perennials.

1. Flowers with both stamens and pistils
   a. Stem leafless or nearly so, 1-2 dm. high — *T. alpínum*
   b. Stem leafy, 3-9 dm. high — *T. sparsiflórum*
2. Flowers with either stamens or pistils, usually on different plants
   a. Achenes flattened — *T. féndleri*
   b. Achenes not flattened, roundish
      (1) Stem leaves sessile or nearly so; some flowers perfect — *T. purpuráscens*
      (2) Stem leaves petioled; dioecious — *T. venulósum*

TRÓLLIUS Linné 1753 GLOBE-FLOWER
(Lat. form of the German *trol*, something round, from the flower)

Sepals 5-15, petal-like, yellow to white, petals 15-25, narrow and claw-like, shorter than the many stamens, pistils 5-25, ripening into as many beaked many-seeded follicles; flowers regular, single; leaves deeply 5-7-parted or divided; perennial.

Plant 1-2 ft. high; flowers 2-4 cm. wide, usually white *T. láxus*

BERBERIDACEAE BARBERRY FAMILY

Sepals 6, petal-like, petals 6, separate, stamens 6, pistil 1, stigma 1, disk-shaped, fruit a berry; flowers in racemes; shrubs with alternate simple or compound spiny leaves.

BÉRBERIS Linné 1753 BARBERRY
(Latinized from the Arabic name)
Pl. 4, fig. 1-3.

Characters of the family; flowers yellow; berry blue.

1. Stems spiny; leaves apparently simple, spatulate *B. féndleri*

2. Stems spineless; leaves compound
   a. Low, 1-3 dm. high, usually trailing; leaflets 3-11, many-toothed *B. répens*
   b. Taller, 1-2 m. high, erect; leaflets 3-7, few-toothed *B. frémónti*

CERATOPHYLLÁCEAE HORNWORT FAMILY

Sepals many, united, petals none, stamens 10-20, ovary 1-celled, style 1, fruit a beaked achene; stamens and pistils in different flowers, the latter solitary in the leaf axils; submerged aquatics, with finely cut leaves in whorls of 5-12.

CERATOPHÝLLUM Linné 1753 HORNWORT

(Gr. *keras, keratos,* horn, *phyllon,* leaf)

Characters of the family.

Stems 2-5 ft. long; leaf lobes thread-like; fruit ellipsoid *C. demérsum*

NYMPHAEÁCEAE WATER LILY FAMILY

Represented by the following genus:

NYMPHAÉA Linné 1753 YELLOW POND LILY

(Gr. *nymphaea,* water nymph)

Pl. 3, fig. 4.

Sepals 5-12, yellow, petal-like, petals many, small, stamen-like, stamens many, pistils many, united, the 8-24 stigmas forming a wheel-like disk; flowers large, single; aquatic herbs with large roundish heart-shaped floating leaves.

Flowers 3-5 in. wide; sepals 9-12; leaves 4-15 in. long *N. polysépala*

BRASSICALES MUSTARD ORDER

PAPAVERÁCEAE POPPY FAMILY

Sepals 2 or 3, usually falling as the bud opens, petals 4-6, separate, stamens many, pistil 1, stigmas one or several, united into a spreading disk, ovary 1-celled or incompletely several-celled, fruit a capsule; flowers single or clustered; herbs with alternate pinnatifid or pinnate leaves and milky or orange-yellow juice.

1. Stem leafless, 1-flowered; leaves not prickly PAPAVER
2. Stem leafy, several-flowered, leaves prickly ARGEMONE

PLATE 4

BARBERRIES—RUES

BARBERRY FAMILY

1. Berberis repens: Barberry
2. Berberis fremonti
3. Berberis fendleri

NETTLE FAMILY

4. Celtis occidentalis: Hackberry

RUE FAMILY

5. Ptelea trifoliata: Hop Trefoil
6. Thamnosma texana

CALTROP FAMILY

7. Covillea tridentata: Creosote Bush

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PAPÁVER Linné 1753 POPPY

(Lat. *papaver*, poppy)

Sepals 2, brown-hairy, petals 4, yellow or red, stamens many, ovary 1-celled, stigma lobes 5-7, capsule bristly-hairy, opening by pores beneath the stigma disk, flowers solitary, bud nodding; leaves basal, pinnatifid; sap white-milky; perennial.

Stems hairy, 2-3 inches high; leaf outline lance-ovate; flowers 1-3 in. wide — *P. alpínum*

ARGEMÓNE Linné 1753 PRICKLY POPPY

(Gr. *argemone*, a kind of poppy used for eye troubles)

Sepals usually 3, sometimes 2, prickly, petals 4-6, white or yellow, stamens many, ovary 1-celled, stigma lobes 3-6, capsule prickly, oblong opening by 4 slits or valves; flowers solitary, large, 2-5 in. wide, buds erect; leaves on the stem, pinnatifid to bipinnate, with stout prickles or sometimes nearly smooth; stem prickly and glaucous, prickly and bristly-hairy, or nearly smooth; sap white to yellow; annual or perennial.

1. Petals white — *A. platýceras*
2. Petals yellow, rarely white — *A. mexicána*

FUMARIÁCEAE BLEEDING HEART FAMILY

Sepals 2, small and scale-like, and easily overlooked, petals 4, paired, irregular, touching and somewhat grown together, one or both of the outer pair sack-like or spurred at the base, stamens 6, in groups of 3, ovary 1-celled, stigma entire or 2-4 lobed, fruit linear to oblong, splitting into 2 valves, or remaining closed; flowers in racemes; herbs with alternate compound leaves; sap clear.

1. Both of the outer petals spurred or sac-like; flower pinkish, solitary. — BICUCULLA
2. One of the outer petals spurred
   a. Flowers yellow; pods oblong, splitting — CAPNOIDES
   b. Flowers purplish; pods globose, closed — FUMARIA

BICUCÚLLA Adanson 1763 BLEEDING HEART

(Lat. *bi-*, two, *cuculla*, cowl, hood, from the sack-like petals)

(Dicentra Bernh.)

Sepals 2, petals 4, the outer sack-like, pinkish, ovary 1-celled, stigma 2-lobed, capsule oblong, swollen, splitting into 2 valves; flowers solitary; leaves basal, pinnate, the leaflets pinnatifid; perennial.

Stems 2-6 in. high; leaves solitary; flowers pinkish — *B. uniflóra*

Capnoídes Adanson 1763 Capnoides

(Gr. *kapnodes,* like smoke, from the odor of some species)
(Corydalis Medicus)
Pl. 5, fig. 6.

Sepals 2, petals 4, one of the outer spurred, golden-yellow, cream, or white, ovary 1-celled, stigma entire or lobed, capsule linear, splitting into 2 valves; flowers in a raceme; leaves compound; annual or perennial.

1. Flowers golden; pods long, linear; leaves finely cut — *C. aúreum*
2. Flowers white or cream; pods short, ellipsoid; leaflets large, ovoid — *C. brandégei*

Fumária Linné 1753 Fumitory

(Lat. *fumarius,* smoky, said to be from the smell of some species)

Sepals 2, petals 4, one of the outer pair spurred, purplish, ovary 1-celled, stigma entire or lobed, fruit 1-seeded, globose, remaining closed; flowers in a raceme; leaves finely cut.

Stems more or less spreading; flowers 4-5 mm. long *F. officinális*

CAPPARIDACEAE CAPER FAMILY

Sepals 4, persistent or deciduous, petals 4, separate, stamens 4-many, pistil 1, ovary 1-celled, often stalked, seeds on the wall, i. e., pariétal, style short, stigma entire, fruit a pod, or capsule but without cross wall, splitting into 2 parts when ripe; flowers solitary or in racemes; herbs or shrubs with alternate simple or digitate leaves, the sap often biting.

1. Petals cut-fringed, unequal in size — Cristatella
2. Petals entire to 3-toothed, not cut-fringed, equal
   a. Pods flat, rhomboid — Cleomella
   b. Pod linear-oblong, more or less cylindric
      (1) Stamens 4-6; pods stalked — Cleome
      (2) Stamens 9-24; pods sessile or nearly so — Polanisia

Cristatélla Nuttall 1834 Fringed Caper

(Lat. *cristatus,* crested, fringed, *-ellus,* small, from the fringed petals)

Sepals 4, petals 4, 2 smaller, cream-colored or whitish, with a stalk or claw, fringed above, stamens 6-12, pod linear-oblong, stalked, beaked, many-seeded; flowers in racemes, occasionally solitary; leaves of 3 leaflets, digitate, sticky; annual.

PLATE 5

VIOLETS—MUSTARDS

VIOLET FAMILY

1. Viola biflora: Yellow Violet
2. Viola pedatifida: Blue Violet

CAPER FAMILY

3. Cleome serrulata: Rocky Mountain Bee Plant

MUSTARD FAMILY

4. Erysimum asperum: Wall Flower
5. Draba aurea
7. Physaria didymocarpa: Bladder Pod

BLEEDING HEART FAMILY

6. Capnoides aureum

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Leaflets 3, linear to oblong; flowers whitish to yellowish, 3-6 mm. long *C. jámesi*

Cleoméлla DeCandolle 1824 Cleomella

(Diminutive of Cleome)

Sepals 4, petals 4, yellow, stalkless, stamens 6, pod rhomboid, short, somewhat inflated, long-stalked, 4-10-seeded; flowers in racemes; leaves of 3 entire leaflets, digitate, smooth; annual.

1. Style none; stalk 1-2 times as long as its pod *C. angustifólia*
2. Style evident; stalk 3 or more times as long as the pod *C. oocárpa*

Cléome Linné 1753. Cleome, Rocky Mountain Bee-Plant

(Of uncertain origin)

(Peritoma D.C.)

Pl. 5, fig. 3.

Sepals 4, petals 4, pink, white or yellow, usually stalked, stamens 6 or 4, pod linear-oblong to oblong, roundish in section, beaked, stalked, 6-30-seeded; flowers in corymbs or racemes; leaves of 3-5-leaflets, digitate, smooth; annual.

1. Flowers pink to white; leaflets 3
   a. Leaflets lanceolate; petals 8-12 mm. long; pods 10-30-seeded *C. serruláta*
   b. Leaflets linear; petals 4 mm. long; pods 6-8-seeded. *C. sonórae*
2. Flowers yellow; leaflets mostly 5 *C. lútea*

Polanísia Rafinesque 1819 Polanisia

(Gr. *polys,* many, *anisos,* unequal, from the stamens)

Sepals 4, purplish, petals 4, whitish to yellowish, stalked, notched, stamens 8-24, unequal, pod oblong, elongated, roundish or somewhat compressed, stalkless or nearly so, many-seeded; flowers in racemes; leaves of 3 entire leaflets, digitate, sticky; annual.

1. Stamens about twice as long as the petals; flowers 7-12 mm. long *P. trachyspérma*
2. Stamens hardly if at all longer than the petals: flowers 4-6 mm. long *P. gravéolens*

BRASSICACEAE MUSTARD FAMILY

Sepals 4, petals 4, rarely none, separate, usually with a claw, stamens usually 6, 2 shorter, rarely 1-4, ovary 2-celled, style 1, stigma entire or 2-lobed, fruit a pod, usually 2-celled and many-seeded; flowers in racemes or corymbs; herbs with alternate simple, rarely compound leaves.

I. Pod round, globose or triangular to short-oblong
  1. Pods flattened
    a. Pods of 2 round halves, resembling spectacles — DITHYREA
    b. Pods round to ovoid or oblong
      (1) Seeds single in each half; pods round to short-oblong — LEPIDIUM
      (2) Seeds 2-many in each half
        (a) Pods round, winged or margined
          x. Pods winged all around; flowers white or purplish — THLASPI
          y. Pods margined above; flowers yellowish — ALYSSUM
        (b) Pods ovoid to elliptic or oblong, not winged
          x. Leaves pinnatifid; seeds several in each cell
            (x) Flowers 1-2 mm. wide; pods 3-4 mm. long — HUTCHINSIA
            (y) Flowers 5-8 mm. wide; pods 6-12 mm. long — SMELOWSKIA
          y. Leaves entire or toothed; seeds many in each cell — DRABA
    c. Pods triangular, not winged; leaves pinnatifid — BURSA
  2. Pods round in section or inflated, not flattened
    a. Submerged aquatic; leaves awl-shaped — SUBULARIA
    b. Terrestrial
      (1) Pods of 2 inflated cells — PHYSARIA
      (2) Pods globose to pear-shaped or oblong, not inflated
        (a) Leaves pinnatifid — ROŘIPA
        (b) Leaves entire
          x. Leaves gray with star-shaped hairs; pods globose to oblong — LESQUERELLA
          y. Leaves green, not stellate-hairy; pods pear-shaped — CAMELINA

II. Pods oblong to linear, more than twice as long as wide
1. Pods strongly flattened
a. Weeds with cream or yellowish flowers and pinnatifid leaves — SISYMBRIUM
b. Natives with white to pink flowers, if yellow the leaves not pinnatifid
(1) Anthers arrow-shaped at base; leaves usually clasping — STREPTANTHUS
(2) Anthers not arrow-shaped
(a) Pods less than 2 cm. long — DRABA
(b) Pods 2-8 cm. long
x. Pods 1-nerved on each face — ARABIS
y. Pods without a distinct nerve or rib on each face — CARDAMINE
2. Pods 4-angled or round in section
a. Pods round in section
(1) Pods closed when ripe; weed — RAPHANUS
(2) Pods splitting when ripe
(a) Pods distinctly stalked in or above the calyx
x. Stamens long-exserted — STANLEYA
y. Stamens included
(x) Petals flat — THELYPODIUM
(y) Petals wavy-margined — CAULANTHUS
(b) Pods not stalked above the calyx
x. Pods with a beak 3-15 mm. long — BRASSICA
y. Pods not beaked
(x) Seeds few — SMELOWSKIA
(y) Seeds many
m. Leaves finely dissected — SOPHIA
n. Leaves pinnatifid, but not finely dissected.
(m) Seeds in 1 row in each half of the pod — SISYMBRIUM
(n) Seeds in 2 rows in each half — RORIPA
b. Pods 4-angled
(1) Pods stalked in or above the calyx — THELYPODIUM
(2) Pods not stalked
(a) Flowers white or cream-colored

x. Flowers cream-colored; pods 2-4 in. long — CONRINGIA
y. Flowers white; pods 2-3 cm. long — STENOPHRAGMA
(b) Flowers yellow to orange, rarely deep red-purple
x. Pods with a beak 3-15 mm. long — BRASSICA
y. Pods beakless or nearly so
(x) Leaves entire or toothed — ERYSIMUM
(y) Leaves pinnatifid — BARBAREA

ALÝSSUM Linné 1753 YELLOW ALYSSUM
(Gr. *alysson*, a plant used to check hiccup)
Pl. 6, fig. 7.

Sepals 4, petals 4, yellowish or whitish, stamens 6, pod round, flattened, winged, 4-seeded, notched, style short; flowers in dense racemes; leaves spatulate to oblong, densely gray stellate-hairy; low annual.
Stems several from the base, hairy; flowers tiny — *A. calycínum*

ÁRABIS Linné 1753 ROCKCRESS
(Named for Arabia)
Pl. 6, fig. 41-42.

Sepals 4, petals 4, white to purple, rarely yellowish, stamens 6, pod long, linear, flat, seeds in 1 or 2 rows, style short; flowers in racemes or corymbs; leaves entire to pinnatifid; annual, biennial or perennial.
1. Pods erect or spreading
a. All or nearly all the stem leaves smooth
(1) Lower part of the stem and basal leaves hairy or shaggy — *A. glábra*
(2) Stem and basal leaves smooth, often glaucous — *A. drummóndi*
b. Stem and leaves usually hairy or cilate throughout — *A. hirsúta*
2. Pods recurved or hanging — *A. holbóelli*

BARBARÉA Linné 1753 WINTERCRESS
(Named for St. Barbara)
Pl. 6, fig. 30.

Sepals 4, petals 4, yellow, stamens 6, pod linear 4-angled. seeds in

1 row, style short, forming a short beak; flowers in racemes; leaves pinnatifid; biennial or perennial.

1. Segments of the leaf 3-9 *B. vulgáris*
2. Segments of the leaf 9-17 *B. praécox*

Brássica Linné 1753 Mustard

(The Latin name of the cabbage)

(Sinapis Linné)

Pl. 6, fig. 33-35

Sepals 4, petals 4, yellow, stamens 6, pods linear, or lanceolate, round or 4-sided in section, often constricted, seeds in 1 row, style long, broadening below into a long often 1-seeded beak; flowers in racemes; basal leaves pinnatifid, stem leaves often merely toothed or entire; annual, biennial or perennial.

1. Beak cylindric or conic.
   a. Pods distinctly and suddenly narrowed into the slender beak
      (1) Pods 1-2.5 cm. long; beak 2-3 mm. long *B. nígra*
      (2) Pods 3-5 cm. long; beak 7-12 mm. long *B. júncea*
   b. Pods tapering gradually into the stout beak, 3-4 cm. long; beak 6-12 mm. long *B. arvénsis*
2. Beak flattened, as long as the pod *B. álba*

Búrsa Weber 1780 Shepherd's Purse

(Lat. *bursa*, purse, from the pod)

(Capsella Medicus)

Pl. 6, fig. 3.

Sepals 4, petals 4, white, stamens 6, pod triangular wedge-shaped, flattened at right angles to the partition, notched, several-seeded, style short; flowers in racemes; leaves pinnatifid, with forked hairs; annual or biennial.

Stems erect from a rosette; stem leaves lanceolate, eared *B. bursa-pastóris*

Camélina Crantz 1762 False Flax

(Gr. *chamae*, on the ground, *linon*, flax, from its growing in flax fields)

Pl. 6, fig. 8.

Sepals 4, petals 4, yellow, stamens 6, pod pear-shaped, somewhat flat-

tened, seeds several to many in 2 rows, style slender; leaves entire or toothed; annual.

Upper leaves clasping, arrow-like; pod margined *C. sativa*

CARDÁMINE Linné 1753 BITTERCRESS

(Gr. *kardamine,* a cress-like herb)

Pl. 6, fig. 39.

Sepals 4, petals 4, white or purple, stamens 6 or 4, pod long, linear, flat, seeds in 1 row, style short or none; flowers mostly in corymbs: leaves entire, lobed or pinnate; mostly perennial.

1. Leaves simple, wavy-toothed or entire, smooth or hairy *C. cordifólia*
2. Leaves pinnatifid or pinnate
   a. Lateral leaflets oblong to linear *C. pennsilvánica*
   b. Lateral leaflets round to broadly obovoid *C. bréweri*

CAULÁNTHUS Watson 1871

(Gr. *kaulos,* stem, *anthos,* flower)

Pl. 6, fig. 38.

Sepals 4, usually purplish, petals 4, greenish-yellow, stamens 6, pod linear, long, nearly round in section, seeds in 1 row, style short; flowers in racemes; leaves entire, toothed or lobed; perennial.

Stem usually fleshy and hollow; flowers ascending to reflexed *C. crassicaúlis*

CONRÍNGIA Heister HARE'S-EAR MUSTARD

(Named for Professor Conring)

Pl. 6, fig. 27.

Sepals 4, petals 4, white or cream-colored, stamens 6, pod linear, long, 4-sided, seeds in 1 row in each half, beaked; flowers in loose corymbs; leaves entire or wavy, clasping; annual.

Leaves oblong to elliptic, glaucous; pods 2-4 in. long *C. orientális*

DITHÝREA Harvey 1845

(Gr. *di-,* two, *thyra,* door, valve, from the pod)

Pl. 6, fig. 17.

Sepals 4, petals 4, yellow to purple, stamens 6, pod of two roundish flattened 1-seeded disks, resembling eye-glasses, style stout; flowers in

dense corymbs or racemes; leaves gray-hairy, wavy-toothed or lobed; perennial.

Stems erect, densely white-hairy; leaves ovate to lanceolate — *D. wislizéni*

DRÁBA Linné 1753 DRABA

(Gr. *drabe*, a plant of the mustard family)

Pl. 5, fig. 5; pl. 6, fig. 18-20.

Sepals 4, petals 4, yellow, yellowish or white, stamens 6, pod ovoid to oblong or linear-oblong, flat, few-many-seeded, style usually short; flowers in racemes or corymbs; leaves simple, entire or toothed; annual, biennial or perennial.

1. Annuals
   a. Flowers white
      (1) Pods in an umbel-like cluster; leaves entire — *D. caroliniána*
      (2) Pods in a raceme; leaves usually toothed — *D. cuneifólia*
   b. Flowers yellow, or white in age
      (1) Plant low, 5-10 cm. high, smooth; leaves basal — *D. crassifólia*
      (2) Plant 10-30 cm. high, hairy; stem leafy, at least below — *D. nemorósa*
2. Perennials, as shown by the rootstock or the old stem or leaf bases
   a. Flowering stems leafless, tufted; flowers yellow to white
      (1) Leaves ovoid to spatulate; pods oblong — *D. ventósa*
      (2) Leaves linear to linear oblong; pods ovoid — *D. oligospérma*
   b. Flowering stems leafy
      (1) Flowers white — *D. incána*
      (2) Flowers yellow
         (a) Pods smooth, straight — *D. chrysántha*
         (b) Pods hairy, twisted
            x. Stem and leaves with long spreading hairs — *D. streptocárpa*
            y. Stem and leaves gray with close hairs — *D. aúrea*

ERÝSIMUM Linné 1753 ERYSIMUM, WALLFLOWER

(Gr. *erysimon*, hedge-mustard, transferred from another plant)

Pl. 5, fig. 4; pl. 6, fig. 28-29.

Sepals 4, petals 4, yellow, orange or purple, pod linear, 4-sided, seeds

PLATE 6

MUSTARD FAMILY

1. Lepidium fremonti
2. Lepidium virginicum
3. Bursa bursa-pastoris
4. Hutchinsia procumbens
5. Thlaspi arvense
6. Thlaspi alpestre
7. Alyssum calycinum
8. Camelina sativa
9. Lesquerella argentea
10. Lesquerella montana
11. Subularia aquatica

12-13. Roripa palustris
14. Roripa curvisiliqua

15-16. Physaria didymocarpa
17. Dithyrea wislizeni
18. Draba oligosperma
19. Draba caroliniana
20. Draba aurea

21-22. Smelowskia calycina

23-25. Sisymbrium incisum
26. Sisymbrium linifolium
27. Conringia orientalis
28. Erysimum asperum
29. Erysimum cheiranthoides
30. Barbarea vulgaris
31. Thelypodium aureum
32. Thelypodium integrifolium
33. Brassica juncea
34. Brassica arvensis
35. Brassica nigra
36. Raphanus raphanistrum
37. Stanleya pinnatifida
38. Caulanthus crassicaulis
39. Cardamine breweri
40. Stenophragma virgatum
41. Arabis drummondi
42. Arabis holboelli
43. Streptanthus cordatus

in 1 row, style stoutish, stigma 2-lobed; flowers in racemes or corymbs; leaves entire, sinuate-toothed or lobed, often gray-hairy; annual, biennial or perennial.

1. Flowers small, petals 3-6 mm. long; pods 1-2.5 cm. long — *E. cheiranthoides*
2. Flowers medium to large, petals 6-20 mm. long; pods 3-20 cm. long
   a. Annual or biennial, i. e., no old woody stems present
      (1) Petals 6-10 mm. long; pods 3-8 cm. long — *E. parviflórum*
      (2) Petals 12-20 mm. long; pods 5-20 cm. long — *E. ásperum*
   b. Perennials, i. e., bases of former stems usually evident
      (1) Flowers yellow; plant low, 2-6 in. high — *E. nivále*
      (2) Flowers orange to brownish-orange, or rose-purple; plant 6-16 in. high — *E. wheéleri*

HUTCHÍNSIA ROBERT Brown 1812

(Named for Miss Hutchins, an Irish botanist)

Pl. 6, fig. 4.

Sepals 4, petals 4, white, stamens 6, pod more or less elliptic, flattened at right angles to the partition, slightly notched, several-seeded, style short or none; flowers in racemes; lower leaves 3-forked or pinnatifid; annual. Stems low, branched, spreading, hairy, 3-8 in. tall *H. procúmbens*

LEPÍDIUM Linné 1753 PEPPERWEED, PEPPERGRASS

(Gr. *lepidion*, little scale, from the pods)

Pl. 6, fig. 1-2.

Sepals 4, petals 4 or none, white or greenish, stamens 2 or 6, rarely 4, style short or none, pod more or less circular, much flattened, usually notched at the top, often winged; flowers in dense often spike-like racemes; leaves entire to pinnatifid, especially the basal; annual, biennial or perennial.

1. Stamens 6
   a. Leaves entire or toothed, oblong-ovate — *L. drába*
   b. Leaves pinnatifid, or narrow when entire
      (1) Some or all the leaves narrow and entire, the basal ones usually pinnatifid
         (a) Pods broadly rounded — *L. fremónti*
         (b) Pods ovoid — *L. alyssoídes*

(2) All or nearly all the leaves pinnatifid; pods ovoid — *L. montánum*

2. Stamens 2, rarely 4
   a. Pods hairy — *L. lasiocárpum*
   b. Pods smooth or nearly so
      (1) Petals typically present — *L. virgínicum*
      (2) Petals tiny or none — *L. apétalum*

Lesquerélla Watson 1888 Bladder Pod

(Named for Lesquereux, an American botanist)

Pl. 6, fig. 9-10.

Sepals 4, petals 4, yellow, stamens 6, pod globose to ovoid or oblong, slightly inflated, hairy or smooth, few-seeded, style long, persistent; flowers densely corymbose; leaves densely gray-stellate hairy, entire; biennial or perennial.

1. Pods hairy
   a. Pods globose; leaves linear to spatulate or obovate — *L. argéntea*
   b. Pods ovoid to oblong
      (1) Plant tufted, 1-3 in. high; leaves usually linear — *L. alpína*
      (2) Plant spreading, stems 3-10 in. long; leaves spatulate to obovate — *L. montána*
2. Pods smooth, globose; leaves linear, lanceolate, spatulate or ovate — *L. féndleri*

Physária Gray 1871 Bladder Pod

(Gr. *physa*, pair of bellows, bubble, from the pods)

Pl. 5, fig. 7; pl. 6, fig. 15-16.

Sepals 4, greenish yellow, petals 4, yellow, rarely cream-colored, stamens 6, pod inflated into two globoid halves, often large and bladder-like, each 1-2-seeded, style long, slender, persistent; flowers in dense corymbs; leaves thickish, gray-hairy or densely gray-felted, the basal in a dense rosette, spatulate, ovoid, rhombic, or fiddle-shaped, entire or lobed, stem leaves lanceolate to lance-ovate or spatulate; rosette perennials.

Stems few to many, prostrate; pod halves 5-15 mm. diam. — *P. didymocárpa*

Ráphanus Linné 1753 Radish

(Gr. *rha-*, quick, *phanos*, appearing, from its quick germination)
Pl. 6, fig. 36.

Sepals 4, petals 4, pink, white or yellow, stamens 6, pod lance-linear, round in section, usually constricted, beaked, 2-10-seeded, remaining closed on ripening, style slender; flowers in racemes or corymbs; leaves usually pinnatifid; annual or biennial.

1. Flowers yellow, fading to white; pod 4-10-seeded *R. raphanístrum*
2. Flowers pink or white; pod 2-3-seeded *R. satívus*

Róripa Scopoli 1760 Watercress

(Name of unknown origin and meaning)
Pl. 6, fig. 12-14

Sepals 4, petals 4, yellow or white, stamens 1-6, pod oblong to cylindric, rarely globoid, round in section, occasionally 1-celled, seeds typically in 2 rows, style mostly short; flowers in racemes; leaves pinnatifid to pinnate-dissected, rarely entire; annual, biennial or perennial, some aquatic.

1. Flowers white
   a. Floating or creeping; leaves of 3-9 leaflets *R. nastúrtium*
   b. Erect; leaves pinnatifid *R. trachycárpa*
2. Flowers yellow
   a. Annuals or biennials
      (1) Pods usually curved, oblong *R. curvisilíqua*
      (2) Pods and pedicels rarely curved
         (a) Plant erect, 1-4 ft. high, smooth to hispid hairy; pods globoid to oblong *R. palústris*
         (b) Plant diffuse, .5-1 ft. high, spreading, usually smooth; pods globoid to oblong. *R. obtúsa*
   b. Perennials, with a horizontal rootstock, low and spreading *R. sinuáta*

Sisýmbrium Linné 1753 Tansy Mustard

(Gr. *sisymbrion*, name of some aromatic plant)
(Sophia Adanson, Schoenocrambe Greene)
Pl. 6, fig. 23-26.

Sepals 4, petals 4, yellow or yellowish, stamens 6, pods linear, round or flat in section, seeds in 1 or 2 rows, style distinct; flowers in racemes; leaves entire, pinnatifid or pinnate; annual, biennial or perennial.

1. Leaves pinnate to bipinnate
   a. Seeds in 1 row in each half of the pod — *S. incísum*
   b. Seeds in 2 rows — *S. pinnátum*
2. Leaves pinnatifid
   a. Lobes broad; petals 3 mm.; pods erect; 1.5-2 cm. — *S. officinále*
   b. Lobes linear; petals 6-8 mm.; pods spreading, 7-10 cm. — *S. altissímum*

Smelówskia C. A. Meyer 1831

(Named for Smelowski, a Russian botanist)

Pl. 6, fig. 21-22.

Sepals 4, petals 4, white or pink, stamens 6, pods lance-oblong, flattened at right angles to the partition, but appearing 4-angled, few-seeded, style short or none; flowers in corymbs or racemes; leaves pinnatifid, hairy, often hoary; tufted perennials.

Stems 2-8 in. high; leaves mostly basal, leaflets linear to ovoid — *S. calycína*

Stánleya Nuttall 1818 Stanleya

(Named for Lord Stanley)

Pl. 6, fig. 37.

Sepals 4, yellow or yellowish, petals 4, yellow to creamy or greenish, stamens 6, pod long, linear, roundish in section, long-stalked; flowers in long racemes; leaves extremely variable, from entire to pinnatifid or even pinnate; perennial.

Leaves entire to pinnatifid or pinnate, smooth or hairy; flowers yellow to creamy or greenish-yellow — *S. pinnatífida*

Stenophrágma Celakovsky 1877

(Gr. *stenos*, narrow, *phragma*, partition)

Pl. 6, fig. 40.

Sepals 4, petals 4, white, stamens 6, pod linear, somewhat 4-angled, seeds in 1 or 2 rows, style short, stout; flowers in racemes; leaves toothed or entire; rosette biennial.

Stems hairy; stem leaves clasping, entire, rosette leaves toothed — *S. virgátum*

STREPTÁNTHUS Nuttall 1838
(Gr. *streptos*, twisted, bent *anthos*, flower)
(Euklisia Rydberg)
Pl. 6, fig. 43.

Sepals 4, petals 4, white, yellow or purple, stamens 6, pod linear or linear-oblong, flat, sometimes beaked, seeds in 1 row; flowers in racemes; leaves simple to pinnatifid, often clasping; annual, biennial or perennial.

1. Stem leaves clasping, ovoid to oblong, usually entire; pods blunt, ascending or spreading *S. cordátus*
2. Lower stem leaves not clasping, often petioled, lance-oblong, pinnatifid; pods beaked, reflexed *S. longiróstris*

SUBULÁRIA Linné 1753 AWLWORT
(Lat. *subula*, an awl, from the shape of the leaves)
Pl. 6, fig. 11.

Sepals 4, petals 4, white, stamens 6, pod oblong to elliptic, short-stalked, seeds few, in 2 rows in each half, style none; flowers few in a raceme; leaves basal, awlshaped; annual submerged aquatic.
Plants tufted in shallow water or in mud, 1-3 in. high *S. aquática*

THELYPÓDIUM Endlicher 1842
(Gr. *thelys*, female, *podion*, little foot, from the stalked ovary)
Pl. 6, fig. 31, 32.

Sepals 4, petals 4, white to purple or yellow, stamens 6, pod linear, long, round or 4-angled in section, sometimes with a short base or stalk, style short; flowers in dense corymbs or racemes; leaves usually entire, sometimes toothed or lobed; annual, biennial or perennial.

1. Flowers white or purple
   a. Stem leaves clasping by an eared base *T. sagittátum*
   b. Stem leaves not clasping
      (1) Stem leaves distinctly petioled, broad, toothed or lobed *T. wrighti*
      (2) Stem leaves sessile or nearly so, narrow and entire *T. integrifólium*
2. Flowers yellow; leaves clasping *T. aúreum*

THLÁSPI Linné 1753 PENNYCRESS
(Gr. *thlaspi*, cress, from *thlao*, crush)
Pl. 6, fig. 5-6.

Sepals 4, petals 4, white, stamens 6, style sometimes very short, pod

circular to ovoid, broadly or narrowly winged, much flattened, more or less notched at the top; flowers in racemes; leaves oblong to ovoid, sessile, entire or toothed, often glaucous; annual or perennial.

1. Pods large, round, broadly winged; leaves coarsely toothed; weed in waste places *T. arvénse*
2. Pods small or medium, slightly winged; leaves usually entire; native from 5-14000 ft. *T. alpéstre*

VIOLACEAE VIOLET FAMILY

Sepals 5, often unequal, petals 5, separate, irregular, the lower one larger or spurred, stamens 5, ovary 1-celled, with 3 seed rows (placentae) on the wall, stigma 1, fruit a capsule, splitting into three parts; flowers solitary or clustered; low stemless or stemmed herbs with simple entire to parted leaves with stipules.

1. Flowers large, 10-25 mm. long; petals of 2 lengths, lower spurred VIOLA
2. Flowers small, 4-6 mm. long; petals of 3 lengths, lower merely swollen at base CALCEOLARIA

VÍOLA Linné 1753 VIOLET, PANSY

(Lat. *viola*, violet)

Pl. 5, fig. 1-2.

Sepals 5, petals 5, blue, purple, yellow, cream-color or white, sometimes with blue or purple veins or dots; flowers solitary, rarely 2; leaves lanceolate to ovate and round, sometimes deeply cut or parted, often all basal; perennial, rarely annual.

1. Stemless, flower- and leaf-stalks arising from the base
   a. Flowers pale lilac to white; rootstock slender, creeping, bearing stolons
      (1) Petals pale lilac, rarely white, somewhat bearded *V. palústris*
      (2) Petals white, purple-veined, beardless *V. blánda*
   b. Flowers blue to purple, rarely pale; rootstock thick, without stolons
      (1) Leaves deeply parted into linear lobes *V. pedatífida*
      (2) Leaves merely wavy-toothed, heart-shaped *V. oblíqua*
2. Leafy-stemmed, leaves and flowers from a visible stem

a. Flowers yellow or cream-colored
  (1) Stipules at base of leaf stalks small, not conspicuous, leaf-like and lobed
    (a) Stems short at flowering; leaves lance-linear to ovoid, rarely heart-shaped at base — *V. nuttálli*
    (b) Stems long, weak; leaves broadly round or kidney-shaped, heart-shaped at base — *V. biflóra*
  (2) Stipules conspicuous, leaf-like and lobed or cut; some petals often bluish — *V. tenélla*
b. Flowers blue, purple or white
  (1) Flowers blue to purple; stipules cut or fringed; plants smooth or rough — *V. canína*
  (2) Flowers white; stipules entire — *V. canadénsis*

Calceolária Loefling 1758

(Lat. *calceolus,* little shoe, from the corolla)

Sepals 5, somewhat unequal, petals 5, white, the lower largest, swollen at base, the two lateral ones larger than the upper; flowers solitary, nodding; leaves alternate or opposite, linear to oblanceolate; perennial.

Stems 3-12 in. high from a woody base; leaves entire — *C. lineáris*

POLYGALÁCEAE MILKWORT FAMILY

Sepals 5, irregular, the two lateral petal-like, petals 3, united into a tube somewhat attached to the stamens, stamens 6 or 8, united below into 1, or into 2 sets, ovary 2-celled, 2-seeded, style simple, fruit a capsule; flowers in racemes, spikes or heads; herbs or shrubs with alternate, opposite or whorled leaves.

Polýgala Linné 1753 Milkwort

(Gr. *polys,* much, *gala,* milk, from its supposed virtue as pasturage)

Characters of the family; flowers white, purple, yellow or greenish.

1. Plants herbaceous; corolla with a fringed crest
  a. Leaves in whorls of 4 or 5 — *P. verticilláta*
  b. Leaves alternate — *P. álba*
2. Plants more or less shrubby and spiny; corolla without a fringed crest
  a. Plant 2-3 ft. high; flowers 3-4 mm. long — *P. acanthóclada*
  b. Plant 2-8 in. high; flowers 7-10 mm. long — *P. subspinósa*

MALVALES MALLOW ORDER

MALVACEAE MALLOW FAMILY

Sepals 5, somewhat united, petals 5, stamens many, the filaments grown into a column and united at base with the petals, ovary 5-20-celled, entire or lobed, styles or stigmas 5-20, fruit a 5-celled capsule splitting when mature, or breaking into 5-20 nutlike segments; flowers solitary, or in racemes or spikes; herbs or shrubs with alternate, simple, entire or divided leaves.

1. Stigmas linear, along inner side of styles
   a. Fruit divisions 1-seeded
      (1) Involucre of 3 bracts; stamens in one tube
         (a) Petals broadly notched; fruits not beaked — MALVA
         (b) Petals straight across; fruits beaked — CALLIRRHOE
      (2) Involucre none
         (a) Stamens in a double series or tube — SIDALCEA
         (b) Stamens in one series — CALLIRRHOE
   b. Fruit divisions 3-several-seeded; involucre none — ABUTILON
2. Stigmas capitate, at tips of styles
   a. Flowers yellow — SIDA
   b. Flowers white to red or vermilion
      (1) Fruit divisions 1-seeded; flowers vermilion — MALVASTRUM
      (2) Fruit divisions 2-3-seeded; flowers white to purple or red — SPHAERALCEA

ABÚTILON Gaertner 1791 VELVET LEAF

(The Arabic name)

Sepals 5, united, without accessory bracts, petals 5, yellow, anthers at the top of the stamen column, ovary with 5-many cavities, stigmas at the tip of the styles, fruits or carpels 2-valved, falling away after ripening; flowers single, axillary; leaves entire or toothed, rarely lobed, heart-shaped at base; annual.

1. Flowers 1-2 cm. wide; carpels 12-15, 2-beaked — *A. avicénnae*
2. Flowers less than 1 cm.; carpels 5, not beaked — *A. párvulum*

CALLÍRRHOE Nuttall 1821 POPPY MALLOW

(Gr. *kallirrhoe*, beautiful flowing, a famous spring at Athens)

Pl. 7, fig. 8.

Sepals 5, united at base, bracts none or 3, petals 5, white to pink or rose-purple, truncate, anthers at the top of the stamen column, ovary with 10-20 cavities, stigmas along the inner side of the styles, fruits or carpels

10-20 in a circle, beaked, closed or splitting, 1-seeded; flowers solitary or few in a terminal cluster; leaves lobed or divided; perennial.

1. Flowers white to pink, 1 in. wide; no bracts below *C. alceoídes*
2. Flowers rose-purple, 1-3 in. wide; bracts 3 *C. involucráta*

Málva Linné 1753 Mallow

(Gr. *malache*, Lat. *malva*, mallow, from its mucilage)

Sepals 5, united, usually with 3 leaf-like bracts just below, petals 5, white to pink or red, anthers at the top of the stamen column, ovary with 10-20 cavities, stigmas along the inner side of the styles, fruits or carpels 10-20 in a circle, beaked, closed, 1-seeded; flowers solitary or clustered; leaves lobed or divided; annual, biennial or perennial.

Stems creeping; leaves rounded, 5-9-lobed; flowers whitish *M. rotundifólia*

Malvástrum Gray 1848 Malvastrum

(Lat. *malva*, mallow, *-astrum*, like, from the resemblance)

Pl. 7, fig. 7.

Sepals 5, united, petals 5, yellow to orange or red, anthers at the top of the stamen column, ovary with 5-many cavities, stigmas at the tip of the styles, fruits or carpels 5-many in a circle, beaked, closed or splitting; flowers solitary or in a spike-like raceme; leaves entire, toothed or divided; annual or perennial.

1. Leaves 3-5-divided, gray with star-shaped hairs *M. coccíneum*
2. Leaves 3-parted, silvery with shield-shaped hairs *M. leptophýllum*

Sída Linné 1753

(Greek name of a plant)

Sepals 5, united, without bracts beneath, petals 5, yellow, anthers at the top of the stamen column, ovary with 5-many cavities, stigmas at the tip of the styles, fruits or carpels 5-many, 1-seeded, mostly closed; flowers solitary or clustered; leaves toothed or lobed; annual or perennial.

Stem and leaves silvery-scaly; leaves arrow-shaped *S. lepidóta*

Sidálcea Gray 1848 Sidalcea

(Gr. *sida*, and *alkea*, mallow)

Pl. 7, fig. 3.

Sepals 5, united, without bracts beneath, petals 5, rose, purple or white, stamens united in 2 rows, ovary with 5-9 cavities, stigmas along the inner

side of the styles, fruits or carpels 5-9, 1-seeded, beakless, mostly closed; flowers in spike-like racemes; leaves lobed or divided; perennial.

1. Flowers white or creamy — *S. cándida*
2. Flowers rose or rose-purple — *S. neo-mexicána*

Sphaerálcea St. Hilaire 1825 Globe-Mallow

(Gr. *sphaira,* ball, *alkea,* mallow)

Sepals 5, united, with 3 leaf-like bracts below, petals 5, white, purple or red, anthers at the top of the stamen column, ovary with 5-many cavities, stigmas at the tip of the style branches, fruits or carpels 5-many, splitting; flowers in spike-like racemes; leaves entire to lobed, often gray-silvery; perennial.

1. Leaves large, deeply lobed, maple-like; petals white or purplish, 2-4 cm. long — *S. rivuláris*
2. Leaves smaller entire or with shallow round lobes; petals rose-purple to red, 1-2 cm. long
   a. Leaves oblong to lanceolate — *S. cuspidáta*
   b. Leaves ovoid or rounded, heart-shaped at base — *S. margináta*

URTICÁCEAE NETTLE FAMILY

Sepals 2-9, often united, petals none, stamens 2-9, ovary 1-celled, styles 1-2, fruit an achene or a nut-like drupe; flowers often imperfect, the stamens and pistils in different flowers; herbs, or trees with alternate or opposite simple leaves.

1. Trees — Celtis
2. Herbs
   a. Climbers, with opposite 3-7-lobed leaves — Humulus
   b. Erect herbs, with entire or toothed leaves
      (1) Low annuals, smooth; leaves entire — Parietaria
      (2) Perennials with stinging hairs; leaves toothed — Urtica

Céltis Linné 1753 Hackberry

(Lat. *celtis,* lotus tree)

Pl. 4, fig. 4.

Sepals 4-6, sometimes united, petals none, stamens 4-6, ovary 1-celled, stigmas 2, fruit a drupe, the outer coat pulpy, the inner stony; leaves alternate in 2 rows, simple, serrate or entire; stamen flowers in a raceme, pistil flowers solitary; trees.

Leaves ovate or lance-ovate, 3-nerved at base; fruit globose, blackish, persisting *C. occidentális*

HÚMULUS Linné 1753 HOP

(Lat. *humus,* ground, perhaps from its trailing habit)

Sepals 5 in the stamen flowers, 1 in the pistil flowers, petals none, stamens 5, ovary 1-celled, stigmas 2, fruit an achene, the latter forming a cone-like cluster when mature; stamen flowers in panicles, pistil flowers in spikes; leaves opposite, 3-7-lobed; climbing herbs.

Stems twining or clambering, rough-hairy *H. lúpulus*

PARIETÁRIA Linné 1753 PELLITORY

(Lat. *paries,* wall, from the habitat of some species)

Sepals 4, often united, petals none, stamens 4, ovary 1-celled, stigma tufted, fruit an achene enclosed in the withered calyx; stamen and pistil flowers clustered in the leaf axils; leaves alternate, entire; smooth annuals.

Plants 6-14 in. high; leaves lanceolate, 3-nerved, 1-3 in. long *P. pennsilvánica*

URTÍCA Linné 1753 NETTLE

(Lat. *urtica,* nettle, from *uro,* burn, from the stinging hairs)

Sepals 4, somewhat united, petals none, stamens 4, ovary 1-celled, stigma tufted, fruit an achene enclosed by the calyx; flowers of two sorts, stamen and pistil-bearing, in long axillary clusters; leaves opposite, serrate; stinging perennials.

1. Leaf bases heart-shaped; leaves broadly ovate *U. dioéca*
2. Leaf bases rounded or tapering; leaves lance-oblong to lance-ovate *U. grácilis*

EUPHORBIACEAE SPURGE FAMILY

Sepals 3-10, united, or 1 and very minute, petals 3-5, small, or none, stamens 4-16, or 1, ovary usually with 3 cavities, ovules 1-2 in each cavity, styles 3, fruit a 3-lobed capsule splitting when ripe; flowers with stamens and pistils separate, mostly single or in racemes, or in minute flower-like heads; herbs with opposite, alternate or whorled mostly simple entire or toothed leaves.

1. Plant silvery-gray with star-shaped hairs; stamens 10 CROTON
2. Plant not gray-stellate; stamens mostly 1-5

a. Stems and leaves with stinging hairs — TRAGIA
b. Stems and leaves without stinging hairs
  (1) Flowers separate — DITAXIS
  (2) Stamen and pistil flowers in a calyx-like cup, often bordered by petal-like glands — EUPHORBIA

CRÓTON Linné 1753 CROTON

(Gr. *kroton,* name of the castor-oil plant)

Stamen flowers with 4-6 united sepals, tiny petals and 5-10 stamens; pistil flowers with 5-10 united sepals, no petals and a 3-celled ovary with 1 ovule in each cell, styles branched, fruit splitting into 3 parts; flowers monoecious, in small clusters; leaves more or less silvery-gray with star-shaped hairs; annual.

Leaves oblong-ovate to lance-oblong, entire, silvery — *C. texénsis*

DITÁXIS Vahl 1824

(Gr. *di-*, two, *taxis,* row, from the stamens)

Stamen flowers with 4-5 united sepals, 4-5 petals, and 4-15 stamens united into a column; pistil flowers similar as to sepals and petals, ovary 3-celled, 1 ovule in each cell, styles branched, fruit splitting into 3 parts; flowers monoecious, in small clusters; leaves entire; perennial.

Plant 4-10 in. high; leaves ovate to oblong, 1-3 cm. long, petioled, hairy — *D. húmilis*

TRÁGIA Linné 1753 TRAGIA

(Named for Tragus or Bock, one of the earliest herbalists)

Stamen flowers with 3-5 united sepals, no petals, and mostly 1-3 stamens; pistil flowers with 3-8 united sepals, 3-celled ovary, 1 ovule in each cell, styles simple; flowers in racemes; leaves toothed, with stinging hairs; perennial.

Plant 4-10 in. high; leaves lance-ovate, 1-5 cm. long — *T. ramósa*

EUPHÓRBIA Linné 1753 SPURGE

(Named for the physician Euphorbus)

Pl. 7, fig. 4.

The apparent flower is really a cluster or involucre, containing several tiny flowers, consisting of one stamen each and a single scale, and one pistil flower, with the characteristic 3-lobed ovary; the 3-lobed fruit projects from the involucre on a stalk; leaves opposite, alternate or whorled, entire, toothed or lobed, typically with a milky juice; annual, biennial, or perennial.

1. Leaves opposite, at least most of them
   a. Leaves wholly entire
      (1) Leaves with the sides unequal at base
         (a) Plant smooth
            x. Seeds smooth
               (x) Stems prostrate, leaves rounded to ovoid, 3-7 mm. long; appendages tiny — *E. sérpens*
               (y) Stems erect or ascending; leaves linear to oblong, 1-3 cm. long; appendages large, white, petal-like — *E. petaloídea*
            y. Seeds wrinkled crosswise
               (x) Appendages of the involucre large and petal-like, usually white — *E. albomarginàta*
               (y) Appendages small and inconspicuous — *E. féndleri*
         (b) Plant hairy; leaves lance-ovoid, very unequal at base — *E. láta*
      (2) Leaves with the sides equal at base, linear to lanceolate, smooth; plant erect — *E. hexágona*
   b. Leaves variously toothed, often but slightly
      (1) Leaves small, about 1 cm. or less long, ovoid to oblong, unequal at base
         (a) Plant smooth
            x. Seeds wrinkled crosswise — *E. glyptospérma*
            y. Seeds pitted, scarcely or not at all wrinkled — *E. serpyllifólia*
         (b) Plant hairy — *E. stictóspora*
      (2) Leaves larger, mostly more than 3 cm. long, equal at base — *E. dentàta*
2. Leaves alternate
   a. Upper leaves white or white-margined; appendages large and petal-like — *E. marginàta*
   b. Upper leaves green; appendages none or inconspicuous
      (1) Leaves toothed, spatulate to broadly oblanceolate; capsule warted — *E. dictyospérma*
      (2 Leaves entire
         (a) Leaves linear; capsule warted — *E. cyparissias*
         (b) Leaves broadly oblong to ovoid or rounded; capsule smooth — *E. montàna*

LIMNANTHACEAE FALSE MERMAID FAMILY

Sepals 2-5, slightly united at base, petals 2-3, separate, alternating with 2-3 glands, stamens 4-6, pistils 2-3, partly united, stigmas 2-3, fruit deeply 2-3-lobed, or the carpels separate, fleshy, not splitting; flowers solitary, axillary, perfect, white to pink; annual herbs with alternate, pinnately divided leaves.

Floérkea Willdenow 1801

(Named for Floerke, a German botanist)

Characters of the family.

Stems weak, 4-15 in. long; leaves .5-3 in. long; flowers 2-3 mm. wide — *F. proserpinacoides*

CALLITRICHACEAE CALLITRICHE FAMILY

Sepals none, petals none, stamens 1, pistil 1, ovary 4-celled, styles 2, fruit flattened, lobed, the lobes more or less winged, separating at maturity into 4 1-seeded carpels; flowers solitary, axillary, perfect or monoecious; aquatic herbs with slender stems and opposite entire spatulate or linear leaves.

Callítriche Linné 1753 Water Starwort

(Gr. *kalli-*, beautiful, *thrix*, hair, from the hair-like stems)

Characters of the family.

1. Submerged; all leaves linear to oblong; bracts none — *C. bífida*
2. Amphibious; air leaves spatulate or obovate; bracts present — *C. palústris*

GERANIALES GERANIUM ORDER

GERANIACEAE GERANIUM FAMILY

Sepals 5, petals 5, stamens 5-10, ovary 5-celled, lobed, ovules 1 or 2 in each chamber, stigmas 5, fruit a capsule splitting into 5 nutlike parts; flowers solitary or clustered; annual, biennial or perennial herbs with alternate or opposite divided or compound leaves.

1. Stamens with anthers 5; leaves pinnate — Geranium
2. Stamens with anthers 10; leaves palmately divided — Erodium

PLATE 7

MALLOWS—GERANIUMS

FLAX FAMILY

1. Linum perenne: Flax

OXALIS FAMILY

2. Oxalis stricta: Wood Sorrel

MALLOW FAMILY

3. Sidalcea neo-mexicana
7. Malvastrum coccineum
8. Callirhoe involucrata: Poppy Mallow

SPURGE FAMILY

4. Euphorbia marginata: Snow-on-the-mountain

GERANIUM FAMILY

5. Erodium cicutarium: Storksbill, Alfilaria
6. Geranium caespitosum: Cranesbill

ROCKY MOUNTAIN FLOWERS

PLATE 7.

ERÓDIUM L'Héritier 1807 STORKSBILL, ALFILARIA

(Gr. *erodios,* heron, from the form of the fruit)

Pl. 7, fig. 5.

Sepals 5, petals 5, pink or rose-purple, the upper 2 smaller, stamens 5, alternating with 5 sterile filaments, ovary 5-lobed, stigmas 5, lobes of the fruit 1-seeded, separating, styles hairy on the inner side; flowers in umbels; leaves pinnate, the leaflets finely cut; annual.

Stems spreading, 2-8 in. high; flowers 6-12 mm. broad. *E. cicutárium*

GERÁNIUM Linné 1753 GERANIUM, CRANESBILL

(Gr. *geranos,* crane, from the form of the fruit)

Pl. 7, fig. 6.

Sepals 5, petals 5, white to red or purple, stamens 10, in 2 rows, ovary 5-lobed, stigmas 5, lobes of the fruit 1-seeded, remaining united by the tips of the styles, the latter not hairy on the inner side; flowers solitary or clustered; leaves palmately 3-9-divided.

1. Petals bright pink, red or purple; plant more or less glandular hairy; typically in dry soil *G. caespitósum*
2. Petals white or pinkish; plant more or less glandular hairy; typically in moist soil *G. richardsóni*

OXALIDACEAE WOOD SORREL FAMILY

Sepals 5, petals 5, yellow, rose-purple or white, stamens 10, in two lengths, united at base, ovary 5-celled, styles 5, fruit a capsule, splitting lengthwise, flowers in cymes; leaves alternate, often basal, of three leaflets; annual or perennial, often stemless, herbs with an acid sap.

OXALIS Linné 1753 WOOD SORREL

(Gr. *oxalis,* sorrel, from *oxys,* sour, from the sap)

Pl. 7, fig. 2.

Characters of the family.

1. Flowers yellow; stems leafy, 1-12 in. high; fruit cylindric *O. stricta*
2. Flowers rose-purple, or whitish; stems leafless, 3-10 in. high; fruit ovoid *O. violácea*

RUTACEAE RUE FAMILY

Sepals 4-5, often united, petals 4-5, stamens 4-8, ovary 2-celled, style 1, fruit a 2-lobed capsule, or a winged samara; flowers solitary or in terminal clusters; shrubs or trees with simple or palmately compound leaves.

1. Leaves palmate, consisting of 3 leaflets; fruit winged — PTELEA
2. Leaves simple; fruit 2-lobed, not winged — THAMNOSMA

PTÉLEA Linné 1753 HOPTREE

(Greek name of the elm)

Pl. 4, fig. 5.

Sepals 4-5, united, petals, 4-5, greenish white, stamens 4-5, ovary 2-celled, style 1, fruit round, broadly winged, 1-seeded; flowers in terminal clusters; leaves of 3 lance-ovate to obovate leaflets; shrubs or low trees.

Shrub 5-20 ft. high; leaflets 1-3 in. long; fruit 12-20 mm. wide — *P. trifoliáta*

THAMNÓSMA Torrey 1858

(Gr. *thamnos,* bush, *osme,* odor)

Pl. 4, fig. 6.

Sepals 4, petals 4, yellow or tinged with purple, stamens 8, ovary 2-celled, style 1, fruit a 2-lobed capsule, with 4-6 seeds in each lobe; flowers solitary; leaves simple, linear, heavy-scented; low shrubs.

Stems branched at base, 3-12 in. high; leaves 1-2 cm. long — *T. texána*

LINACEAE FLAX FAMILY

Sepals 5, petals 5, yellow or blue, falling after a few hours, stamens 5, united below, ovary 4-5-celled, or 8-10-celled by new partitions, styles 5, fruit a capsule opening by 5-10 valves; flowers in cymes or racemes; annual or perennial herbs with alternate, opposite or whorled simple entire leaves.

LÍNUM Linné 1753 FLAX

(Gr. *linon,* Lat. *linum,* flax)

Pl. 7, fig. 1.

Characters of the family.

1. Flowers blue
   a. Petals 3-4 times, fruit 2-3 times, longer than the obtuse sepals — *L. perénne*

b. Petals 2 times longer, fruit hardly longer, than the sepals *L. usitatissimum*

2. Flowers yellow; plant glabrous or finely hairy *L. rigidum*

ZYGOPHYLLACEAE CALTROP FAMILY

Sepals 5, petals 5, stamens 10, ovary 5-12-celled, style 1, fruit splitting into 5-12 nutlike divisions; flowers solitary; herbs or shrubs with opposite compound leaves.

1. Leaflets 2; shrub — Covillea
2. Leaflets 6-10; herb — Kallstroemia

Covíllea Vail 1895 Creosote Bush

(Named for the American botanist, Coville)

Pl. 4, fig. 7.

(Larrea Mor.)

Sepals 5, petals 5, yellow, stamens 10, ovary 5-celled, style 1, fruit long-hairy, splitting into 5 nutlike divisions; flowers solitary; leaves of 2 leaflets, evergreen, heavy-scented; shrubs.

Branched shrub 3-10 ft. high; leaflets unequal, oblong, curved *C. tridentáta*

Kallstróemia Scopoli 1777 Caltrop

(Named for Kallstroem)

Sepals 5, petals 5, yellow, deciduous, stamens 10, ovary 10-12-celled, style 1, fruit splitting into 10-12 divisions; flowers solitary; leaves pinnate, of 6-10 leaflets; annual.

Plants spreading, hairy, 3-15 in. high; fruit beaked, warted *K. máxima*

CISTALES ROCKROSE ORDER

CISTACEAE ROCKROSE FAMILY

Sepals 3-5, unequal, petals 5, 3 or none, yellow, stamens many, ovary 1-several-celled, style 1, stigma 1, sometimes 3-lobed, fruit a capsule; flowers of two sorts, petal-bearing and petal-less, in racemes or panicles; woody herbs with alternate simple entire leaves.

HELIÁNTHEMUM Persoon 1807 FROSTWEED
(Gr. *helios,* sun, *anthemon,* flower, from the golden petals)

Characters of the family.

Leaves lance-oblong to oblanceolate; petal flowers terminal — *H. május*

HYPERICÁCEAE ST. JOHN'S WORT FAMILY

Sepals 5, petals 5, yellow, stamens many, often in clusters, ovary 3-5-celled or 1-celled, with 3-5 seed rows on the wall, styles 3-6, fruit a 1-6-celled capsule; flowers in cymes; annual or perennial herbs with opposite simple entire dotted leaves.

HYPÉRICUM Linné 1753 ST. JOHN'S WORT
(Gr. *hyperikon,* St. John's wort)

Characters of the family.

1. Petals twice the length of the sepals or longer — *H. formósum*
2. Petals little if at all longer than the sepals — *H. május*

ELATINÁCEAE WATERWORT FAMILY

Sepals 2-4, petals 2-4, stamens 2-8, ovary 2-4-celled, styles 2-4, fruit a globose many-seeded capsule opening by 2-4 valves; flowers tiny, solitary in the leaf axils; aquatic or marsh herbs with opposite or whorled simple leaves.

ELATÍNE Linné 1753 WATERWORT
(Gr. *elatine,* a kind of toad-flax)

Characters of the family.

1. Flowers in 2's; leaves obovate — *E. americána*
2. Flowers usually in 3's; leaves oblong or oblanceolate — *E. triándra*

FRANKENIÁCEAE FRANKENIA FAMILY

Sepals 5, united, petals 5, white, stamens 5, or more, ovary 1-celled, with 2-3 seed rows on the wall, styles 2-4, fruit a capsule enclosed by the persistent calyx; flowers solitary or clustered in the axils; perennial herbs with opposite or clustered simple leaves.

FRANKÉNIA Linné 1753
(Named for Franken, a Swedish physician)

Characters of the family.

Stems woody at base; leaves clustered, linear, 5-6 mm. long — *F. jámesi*

CARYOPHYLLALES PINK ORDER

CARYOPHYLLACEAE PINK FAMILY

Sepals 4-5, separate or united into a tube, petals 4-5 or none, separate, the lower half often claw-like, stamens 10, rarely 3-8, ovary mostly 1-celled, rarely 3-5-celled, styles 2-5, fruit typically a capsule with several to many seeds; flowers solitary or variously clustered; annual or perennial herbs with opposite simple entire leaves.

1. Sepals united into a tube
   - a. Styles 2 — SAPONARIA
   - b. Styles 3, rarely 4 — SILENE
   - c. Styles 5
     - (1) Calyx lobes long and leaf-like — AGROSTEMMA
     - (2) Calyx lobes not long and leaf-like — LYCHNIS
2. Sepals separate, or at least not forming a tube
   - a. Petals present
     - (1) Petals deeply notched or 2-cleft
       - (a) Styles 3, rarely 4 — STELLARIA
       - (b) Styles 5 — CERASTIUM
     - (2) Petals entire or nearly so
       - (a) Styles 3
         - x. Leaves with papery stipules at base — SPERGULARIA
         - y. Leaves without papery stipules, mostly linear and sharp-tipped — ARENARIA
       - (b) Styles 5 — SAGINA
   - b. Petals absent; leaves with papery stipules — PARONYCHIA

AGROSTÉMMA Linné 1753 CORN COCKLE

(Gr. *agros,* field, *stemma,* garland)

Pl. 9, fig. 3.

Sepals 5, united into a 10-ribbed tube, the lobes long, narrow and leaf-like, petals 5, red, with a claw-like base, stamens 10, ovary 1-celled, styles 5, fruit a capsule; flowers solitary on long stalks; leaves opposite, simple, entire; annual.

Leaves lance-linear; flowers 2-3 in. wide — *A. githágo*

ARENÁRIA Linné 1753 SANDWORT

(Lat. *arena,* sand, from the habitat of many species)

(Moehringia Linné)

Pl. 9, fig. 4-5.

Sepals 5, separate, petals 5, white, entire or nearly so, rarely wanting, stamens 10, ovary 1-celled, styles usually 3, rarely 2-5, fruit splitting usu-

PLATE 8

PINK ORDER

FOUR O'CLOCK FAMILY

1. Allionia linearis
2. Mirabilis multiflora: Four-O'Clock

GOOSEFOOT FAMILY

3. Chenopodium capitatum: Strawberry Blite

BUCKWHEAT FAMILY

4. Polygonum pennsilvanicum: Heart's-ease
5. Eriogonum flavum
8. Rumex venosus: Dock

PINK FAMILY

6. Silene acaulis: Alpine Pink
7. Saponaria vaccaria: Cow Pink

1
2
3
4
5
6
7
8

ally into 3-6 valves; flowers in terminal clusters or solitary; leaves opposite, simple, entire; annual or perennial.

1. Leaves needle-shaped, the tips often sharp
   a. Sepals lanceolate, long-pointed; leaves sharp-pointed
      (1) Flowers in an open branching cluster
         (a) Leaves rigid and pungent, 1-2 cm. long *A. púngens*
         (b) Leaves softer and less pungent, 2-10 cm. *A. féndleri*
      (2) Flowers in a dense head-like cluster *A. hoókeri*
   b. Sepals oblong to lance-ovate, obtuse or short-pointed; leaves not sharp-pointed; dwarf alpine plants
      (1) Flowers 8-15 mm. wide; petals much longer than sepals *A. biflóra*
      (2) Flowers 3-6 mm. wide; petals about as long as sepals *A. vérna*
2. Leaves much broader, lanceolate to ovate
   a. Petals about twice as long as sepals *A. lateriflóra*
   b. Petals shorter to a little longer than sepals
      (1) Leaves 2-6 cm. long *A. macrophýlla*
      (2) Leaves .5-1.5 cm. long *A. saxósa*

Cerástium Linné 1753 Chickweed

(Gr. *kerastion,* little horn, from the form of the pod)

Pl. 9, fig. 7-8.

Sepals 5, rarely 4, separate, petals 5, or 4, white, notched or cleft, rarely wanting, stamens usually 10, ovary 1-celled, styles 5, or 3-4, fruit opening by 10, rarely 8, apical teeth; flowers in terminal clusters, or solitary; leaves opposite, simple, entire; annual or perennial.

1. Perennials, shown by the presence of rootstocks or old stems, smooth or hairy; flowers 10-15 mm. wide; pods little longer than calyx *C. arvénse*
2. Annuals, sticky-hairy; flowers 4-6 mm. wide; pods 2-3 times longer than calyx *C. nútans*

Lýchnis Linné 1753 Lychnis

(Gr. *lychnos,* lamp, from the use of a woolly species for wicking)

Pl. 9, fig. 2.

Sepals 5, united into a tube, petals 5, entire, cleft or fringed at the tip, with a claw-like base, rarely wanting, white to red, stamens 10, ovary mostly

1-celled, styles mostly 5, fruit splitting by 5-10 valves; flowers solitary or clustered; leaves opposite, simple, entire; biennial or perennial.

1. Alpine dwarf, 2-5 in. high; stems 1-flowered; petals exserted or included — *L. áffinis*
2. Stems 1-2 ft. high, several-flowered; petals usually included — *L. drummóndi*

Paronýchia Adanson 1763 Paronychia

(Gr. *paronychia,* swelling about a nail, and hence used of the healing plant)

Pl. 9, fig. 9-10.

Sepals 5, somewhat united, bristly-tipped, petals none, stamens 5, sometimes with 5 sterile ones also, ovary 1-celled, style 2-cleft, fruit small, bag-like, 1-seeded; flowers solitary or clustered; leaves opposite, simple, entire; perennial.

1. Plants densely cushion-like; flowers mostly solitary and terminal
   a. Leaves oblong, obtuse; stipules entire — *P. pulvináta*
   b. Leaves needle-like, sharp-pointed; stipules 2-cleft — *P. sessiliflóra*
2. Plants tufted, but rarely densely cushion-like; flowers in clusters; leaves awl-shaped, bristle-pointed — *P. jámesi*

Sagína Linné 1753 Pearlwort

(Lat. *sagina,* food, from its early use for pasturage)

Sepals 4-5, separate, petals 4-5, or none, whitish, stamens 4, rarely 5, ovary 1-celled, styles 4-5, fruit splitting to the base into 4-5 valves; flowers solitary; leaves minute, awl-shaped; low annuals or perennials.

1. Petals shorter than the green sepals — *S. saginoídes*
2. Petals longer than the purplish sepals — *S. nivális*

Saponária Linné 1753 Soapwort; Cow-herb

(Lat. *saponaria,* soap-like, from the soapy sap)

Pl. 8, fig. 7.

Sepals 5, united into a tube, petals 5, white, pink or red, with a claw, stamens 10, ovary 1-celled or imperfectly several-celled, styles 2, fruit a capsule opening by 4 apical teeth; flowers in corymbs or corymb-like clusters; annual or perennial.

1. Flowers 2-3 cm. wide, in a dense cluster; calyx tubular *S. officinális*
2. Flowers about 1.5 cm. wide, on slender stalks; calyx becoming 5-angled and inflated in fruit *S. vaccária*

Siléne Linné 1753 Catchfly, Campion

(Probably from Gr. *sialos,* saliva, from the sticky stems)

Pl. 8, fig. 6; Pl. 9, fig. 1.

Sepals 5, united into a tube, petals 5, white or pink, yellowish or purplish, the lower part narrow and claw-like, stamens 10, ovary 1-celled, or somewhat 2-4-celled, styles, 3, rarely 4, fruit opening by 6 or 3 apical teeth; flowers solitary or clustered; leaves opposite, simple, entire; annual or perennial.

1. Stemless alpine mat plants; flowers pink *S. acaúlis*
2. Leafy-stemmed; flowers white to purplish or pink
   a. Calyx swollen and bladdery; weed *S. vulgáris*
   b. Calyx not swollen and bladdery
      (1) Annual weeds
         (a) Stems sticky-hairy; flowers white, night-blooming, fragrant *S. noctiflóra*
         (b) Stems smooth, the upper joints sticky; flowers pink, day-blooming *S. antirrhína*
      (2) Perennials, natives
         (a) Flowers in spreading forked clusters; leaves broad, thin *S. menziési*
         (b) Flowers in a long narrow cluster; leaves narrow, thick *S. scoúleri*

Spergulária Persoon 1805 Sand Spurry

(Lat. *spergo,* to scatter; *spergula,* a little weed)

(Tissa Adanson)

Sepals 5, separate, petals 5 to none, white to purplish or lilac, entire, stamens 10, or fewer, ovary 1-celled, styles 3, capsule opening by 3 valves; flowers solitary or clustered; leaves linear, opposite and entire; annual or perennial.

Flowers violet, solitary; low branching annual *S. sparsiflóra*

STELLÁRIA Linné 1753 STARWORT

(Lat. *stellaria,* star-like, from the flower)

(Alsine Linné)

Pl. 9, fig. 6.

Sepals 5, rarely 4, separate, petals 5, or 4, or rarely none, white, notched or 2-cleft, stamens usually 10, ovary 1-celled, styles usually 3, rarely 4-5, fruit splitting usually into 6 valves; flowers in terminal clusters or solitary; leaves opposite, simple, entire; annual or perennial.

1. Leaves ovate, the lower distinctly petioled; weeds — *S. média*
2. Leaves mostly lanceolate or linear, without petiole
   a. Petals absent
      (1) Flowers in a terminal umbel-like cluster with small papery scales — *S. umbellàta*
      (2) Flowers mostly lateral in the axils of leaves
         (a) Leaves lanceolate; stems erect — *S. boreàlis*
         (b) Leaves ovate; stems prostrate — *S. obtúsa*
   b. Petals present
      (1) Smooth or hairy, but not sticky
         (a) Floral leaves mostly small papery scales — *S. longifólia*
         (b) Floral leaves mostly leaf-like — *S. boreàlis*
      (2) Sticky-hairy — *S. jamesiàna*

PORTULACÁCEAE PURSLANE FAMILY

Sepals 2, rarely 4-8, separate, petals 5, rarely 3-16, white to red or yellow, separate, stamens 2-many, ovary 1-celled, style 1, 2-3-cleft, fruit a capsule opening by a cap or by 3 valves; flowers solitary or clustered; annual or perennial herbs with fleshy, alternate or opposite, usually entire, leaves.

1. Sepals 2, rarely 3
   a. Stigmas 3; flowers rose or white, rarely yellow
      (1) Sepals falling away — TALINUM
      (2) Sepals persistent
         (a) Stamens 5 — CLAYTONIA
         (b) Stamens more than 5 — OREOBRÒMA
   b. Stigmas 2; flowers rose

(1) Petals 2; stamen 1 — Calyptridium
(2) Petals 4; stamens 3 — Spraguea
c. Stigmas 4-6; flowers yellow — Portulaca
2. Sepals 4-8 — Lewisia

Calyptrídium Nuttall 1838
(Gr. *kalyptra*, cap, *-idium*, little)

Sepals 2, usually persistent, petals 2, rose, minute, stamens 1, ovary 1-celled, stigmas 2, capsule 2-valved; flowers in axillary or terminal spikes; leaves alternate; annual.

Stems weak, 2-5 in. long; leaves oblong-spatulate — *C. roseum*

Claytónia Linné 1753 Spring Beauty
(Named for Clayton, an American botanist)
Pl. 9, fig. 11-12.

Sepals 2, persistent, petals 5, white, rose or yellow, stamens 5, on the petal bases, ovary 1-celled, stigmas 3, capsule 3-valved; flowers in terminal clusters; leaves opposite or alternate; annual or perennial.

1. Basal leaves spatulate in a dense rosette, from a fleshy tap root; at 10-14000 ft. — *C. megarrhiza*
2. Basal leaves few, single or none, linear to lance-oblong; at 5-9000 ft.
   a. Stems from a bulb-like corm — *C. lanceoláta*
   b. Stems not arising from a corm, often with runners or rooting at the joints — *C. chamíssoi*

Lewísia Pursh 1814 Bitter-root
(Named for Lewis, of the Lewis and Clarke expedition)

Sepals 4-8, unequal, persistent, petals 8-16, rose to white, stamens many, ovary 1-celled, style deeply 3-8-cleft, capsule splitting circularly; flowers single; leaves in a dense rosette; perennial.

Stemless; leaves linear to spatulate, 1-3 cm. long; flowers 1-2 in. wide — *L. rediviva*

Oreobróma Howell 1893 Oreobroma
(Gr. *oreos, mountain, broma,* food)
Pl. 9, fig. 13.

Sepals 2, persistent, petals 5-10, red, pink or white, stamens more than 5, ovary 1-celled, style 3-7-cleft, capsule opening circularly; flowers solitary or few in a cluster; leaves linear to spatulate; perennial.

1. Leaves basal in a rosette, from a tap root; stem leaves mere scales
   a. Petals rose-red; sepals toothed — *O. pygmaéa*
   b. Petals white; sepals entire — *C. nevadénsis*
2. Stem leaves 2-3, basal leaves none, from a bulb-like corm — *O. triphýlla*

Portuláca Linné 1753 Purslane

(Lat. *portulacus,* purgative)

Sepals 2, united below and partly grown together with the ovary, petals usually 5, yellow or red as a rule, stamens 7-many, ovary 1-celled, partly inferior, style deeply 3-9-cleft; flowers solitary, usually terminal; leaves alternate, obovate, spatulate or cylindric; annual.

Prostrate-spreading; flowers 4-6 mm. wide, opening only in sunshine — *P. olerácea*

Spráguea Torrey 1853

(Named for Sprague, a botanical artist)

Sepals 2, unequal, petals 4, rose, stamens 3, ovary 1-celled, stigmas 2, capsule 2-valved; flowers in dense spikes, grouped in an umbel: leaves mostly basal, spatulate; biennial.

Stems 2-10 in. high; sepals papery, as long as petals — *S. múlticeps*

Talínum Adanson 1763 Talinum

(Of unknown meaning)

Pl. 9, fig. 14.

Sepals 2, petals 5, pink to white, disappearing, stamens 5-10, ovary 1-celled, stigmas 3, capsule 3-valved; flowers in open clusters; leaves alternate, linear-cylindric; perennial.

Stems 3-10 in. high; leaves basal; flowers pink — *T. parviflórum*

AIZOÁCEAE CARPET-WEED FAMILY

Sepals 4-5, united, petals none, stamens 3-5, ovary 3-5-celled, styles 3-5, fruit a capsule; flowers perfect, solitary or clustered; annual herbs with opposite or whorled simple entire leaves.

1. Leaves opposite, fleshy — Sesuvium
2. Leaves whorled, not fleshy — Mollugo

Sesuvium Linné 1753 Sea Purslane

(Of doubtful meaning)

Sepals 5, united, pink or purplish, petals none, stamens 5-60, ovary 3-5-celled, styles 3-5, warted along the inner side, capsule 3-5-celled, oblong, splitting circularly; flowers solitary or clustered in the axils; leaves opposite; fleshy annual.

Stems spreading, 3-12 in. long; flowers 2 mm. wide *S. maritimum*

Mollugo Linné 1753 Carpet-weed

(Lat. *mollis*, soft)

Sepals 5, greenish-white, united, petals none, stamens 3-5, ovary 3-celled, globose or ovoid, capsule 3-celled, 3-valved; flowers small, axillary; leaves in whorls; annual.

Stems prostrate; leaves 1-3 cm. long; flowers 2 mm. wide *M. verticillata*

POLYGONACEAE BUCKWHEAT FAMILY

Sepals 2-6, united, greenish or petal-like, often winged in fruit, petals none, stamens 2-9, ovary 1-celled, style 2-3-cleft, fruit an achene, usually 3-angled; flowers small, greenish or colored, perfect, monoecious or dioecious, in spikes, heads, racemes or panicles; herbs or twining vines with alternate rarely opposite or whorled simple leaves, and usually with boot-like papery stipules or sheaths at the joints of the stem.

1. Flower clusters with a toothed involucre; stamens 9; stems without papery sheaths — Eriogonum
2. Flower clusters without involucre; stamens 4-8; stem with papery sheaths at the joints
   a. Calyx 6-parted, the 3 inner sepals usually winged; stigmas tufted — Rumex
   b. Calyx 4-5-parted
      (1) Stigmas tufted; achene winged — Oxyria
      (2) Stigmas globose; achenes not winged — Polygonum

Eriogonum Michaux 1803 Eriogonum

(Gr. *erion*, wool, *gonu*, knee, from the woolly jointed stems)

Pl. 8, fig. 5.

Sepals 6, united, petal-like, white, pink, or yellow to orange-red, petals none, stamens 9, ovary 1-celled, style 3-parted, stigmas capitate, fruit a 3-angled achene; flowers in a 5-8-toothed top-shaped to cylindric involucre.

the involucres in racemes, panicles, or heads; leaves simple, usually entire, alternate, opposite, whorled or basal; annual or perennial.

1. Flowers white or pink
   a. Flower involucres in dense heads or head-like clusters
      (1) Heads single on leafless stalks
         (a) Leaves ovoid to elliptic, densely white-woolly — *E. ovalifólium*
         (b) Leaves oblanceolate or linear
            x. Leaves oblanceolate, densely white-woolly — *E. múlticeps*
            y. Leaves linear, green, usually smooth — *E. pauciflórum*
      (2) Heads many in forking leafy clusters; leaves oblanceolate, woolly — *E. jámesi*
   b. Flower involucres in forking cymes or in a long spike-like cluster
      (1) Flowers in forking cymes
         (a) Stems leafy
            x. Perennials, the stems woody at base, and branched
               (x) Leaves ovate to elliptic; branches few — *E. jónesi*
               (y) Leaves linear to oblong; branches several to many
                  m. Stamens and styles included — *E. effúsum*
                  n. Stamens and styles exserted — *E. corymbósum*
            y. Annuals, the stems simple at base, densely white woolly — *E. ánnuum*
         (b) Leaves basal
            x. Leaves linear to oblanceolate, greenish above, white-woolly below — *E. símpsoni*
            y. Leaves ovoid to orbicular
               (x) Flower involucres hanging — *E. cérnuum*
               (y) Flower involucres erect or ascending
                  m. Annual; stems single; leaves 1-5 cm. long, green — *E. górdoni*
                  n. Perennial; stems tufted; leaves 5-15 cm. long, densely white-woolly — *E. tenéllum*

(2) Flowers in a long narrow spike-like cluster; leaves basal, ovate to lanceolate, white-woolly below — *E. racemósum*

2. Flowers yellow, yellowish or cream-colored
   a. Flower involucres in dense heads or head-like clusters
      (1) Heads single on a leafless stalk
         x. Heads with leaf-like bracts beneath — *E. flávum*
         y. Heads with inconspicuous bracts
            (x) Flower stalks 1-2 cm. high; leaves 3-5 mm. long — *E. acaúle*
            (y) Flower stalks 5-30 cm. high; leaves 5-30 mm. long
               m. Leaves ovate to elliptic — *E. ovalifólium*
               n. Leaves oblong to spatulate — *E. caespitósum*
      (2) Heads in umbels or in forking cymes
         x. Heads in umbels, the latter sometimes compound
            (x) Leaves linear or narrowly oblanceolate — *E. chrysocéphalum*
            (y) Leaves oblong, spatulate, obovate or rounded
               m. Calyx hairy; leaves mostly spatulate, woolly — *E. flávum*
               n. Calyx smooth
                  (m) Flower stalk with a ring of leaves near the middle — *E. heracleoides*
                  (n) Flower stalk without a median ring of leaves — *E. umbellátum*
         y. Heads in 2-4-forked clusters
            (x) Calyx tapering into its stalk — *E. bákeri*
            (y) Calyx abruptly passing into its stalk — *E. lachnógynum*
   b. Flower involucres in open much-branched clusters
      (1) Stems leafy, not inflated; leaves oblanceolate to spatulate
         (a) Stems bristly-hairy, perennial, 2-6 ft. high; achenes winged — *E. alátum*
         (b) Stems smooth, annual, 2-6 in. high; achenes not winged — *E. salsuginósum*

PLATE 9

PINKS—AMARANTHS

PINK FAMILY

1. Silene scouleri: Catchfly
2. Lychnis drummondi
3. Agrostemma githago; Corn Cockle
4. Arenaria biflora: Sandwort
5. Arenaria fendleri
6. Stellaria longifolia: Starwort
7. Cerastium arvense: Chickweed
8. Cerastium nutans
9. Paronychia jamesi
10. Paronychia pulvinata

PURSLANE FAMILY

11. Claytonia chamissoi: Spring Beauty
12. Claytonia megarrhiza; leaf and flower stalk
13. Oreobroma pygmaea
14. Talinum parviflorum

FOUR O'CLOCK FAMILY

15. Abronia fragrans: a, leaf; b, cluster and fruit
16. Abronia micrantha: fruit

BUCKWHEAT FAMILY

17. Polygonum bistorta: Bistort
18. Oxyria digyna: Mountain Sorrel; fruit cluster

AMARANTH FAMILY

19. Froelichia floridana
20. Acnida tamariscina: Water-hemp
21. Amarantus hybridus: Amaranth
22. Amarantus graecizans

(2) Stems leafy at base only, often inflated
(a) Stems top-like, inflated, bluish; leaves smooth, ovate to round — *E. inflátum*
(b) Stems solid; leaves woolly, oblanceolate to spatulate — *E. campanulátum*

Oxýria Hill 1765 Mountain Sorrel
(Gr. *oxys*, sour)
Pl. 9, fig. 18.

Sepals, 4, united, green; petals none, stamens 6, ovary 1-celled, style short, 2-parted, stigmas fringed, persistent on the wings of the fruiting calyx, fruit an ovate, lens-shaped achene; flowers small, perfect, in terminal panicles; leaves mostly basal, long-petioled, kidney-shaped, round, or heart-shaped; perennial.

Stems 2-15 in. high; leaves 1-4 cm. wide — *O. dígyna*

Polýgonum Linné 1753 Smartweed, Knotweed, Bindweed
(Gr. *polys*, many, *gonu*, knee, from the jointed stems)
Pl. 8, fig. 4; pl. 9, fig. 17.

Sepals 4-5, united, green, white, pink or purple, petals none, stamens 3-8, ovary 1-celled, style 2-3-parted, stigmas globose, fruit a flattened or 3-angled (rarely 4-angled) achene; flowers small in terminal or axillary clusters; leaves alternate, entire with funnel-form sheaths at the base; annual or perennial, terrestrial or aquatic.

1. Flowers in a single (rarely 2) terminal spike-like cluster or raceme, white to rose-red
a. Flowers usually white; stems from a thick often bent rootstock; at altitudes of 7-14000 ft.; bistorts
(1) Raceme oblong, 1-5 cm. long, 1-2 cm. wide; stems 2-10 dm. high — *P. bistórta*
(2) Raceme cylindric 3-10 cm. long, .5-1 cm. wide; stems 1-2 dm. high — *P. viviparum*
b. Flowers rose-red or pinkish, sometimes white to greenish; at altitudes of 3-7000 feet; water or mud plants; hearts-ease, smartweeds
(a) Racemes 1-3 cm. long; leaves elliptic-oblong, obtuse or acute — *P. amphíbium*
(b) Racemes 3-10 cm. long; leaves lance-ovate, long-pointed — *P. emérsum*

2. Flowers in several to many axillary or terminal racemes or clusters
   a. Flowers in large axillary and terminal racemes
      (1) Stems twining or trailing; leaves ovate-arrow-shaped or heart-shaped; bindweeds
         (a) Leaves ovate to lance-arrow-shaped; stems .5-4 ft. long; sepals not winged in fruit — *P. convólvulus*
         (b) Leaves ovate-heart-shaped; stems 3-10 ft. long; sepals broadly winged in fruit — *P. scándens*
      (2) Stems erect, not twining; leaves not arrow-shaped, or heart-shaped
         (a) Papery sheaths at the swollen stem joints fringed with bristles
            x. Racemes erect
               (x) Racemes oblong, dense — *P. persicária*
               (y) Racemes cylindric, narrow, often interrupted
                  m. Sepals covered with waxy dots — *P. punctátum*
                  n. Sepals without waxy dots — *P. hydropiperoídes*
            y. Racemes nodding; flowers greenish; juice sharp — *P. hydropíper*
         (b) Papery sheaths not fringed with bristles
            x. Racemes nodding, lance-cylindric, narrow; stamens 6 — *P. lapathifólium*
            y. Racemes erect, oblong, broad; stamens usually 8 — *P. pennsilvánicum*
   b. Flowers mostly in small axillary clusters, the ends of the branches in some raceme-like; knotweeds
      (1) Clusters all axillary, the stems leafy throughout
         (a) Plants prostrate, or nearly so; leaves small; stamens mostly 8 — *P. aviculáre*
         (b) Plants erect; leaves large; stamens 5-6 — *P. eréctum*
      (2) Clusters axillary, but the upper leaves inconspicuous
         (a) Flowers and fruits erect
            x. Achenes projecting beyond the calyx for half its length or more — *P. exsértum*

y. Achenes enclosed in the calyx or nearly so
(x) Stems branched throughout; stamens 3-6 — *P. ramosíssimum*
(y) Stems branched from the base; stamens 8 — *P. ténue*
(b) Flowers and fruits hanging — *P. doúglasi*
(3) Clusters really axillary but forming a terminal spike-like cluster by the reduction of the upper leaves or the aggregation of the flowers
(a) Raceme long, slender and interrupted — *P. spergularifórme*
(b) Raceme short and crowded, head-like
x. Plants mostly 1-10 cm. high; floral leaves broadly white-margined; stamens 8 — *P. polygaloídes*
y. Plants mostly 10-20 cm. high; floral leaves green; stamens 3-5 — *P. wátsoni*

RÚMEX Linné 1753 SORREL, DOCK
(Lat. name of the sorrel)
Pl. 8, fig. 8.

Sepals 6, the 3 inner mostly developed into wings in fruit, green, petals none, stamens 6, ovary 1-celled, style 3-parted, stigmas shield-shaped, tufted, fruit a 3-angled achene with wings, either entire, or with bristle-like teeth, flowers perfect, dioecious or polygamo-monoecious, whorled on jointed stalks in racemes or panicles; leaves entire or wavy-margined, the sheaths cylindric, brittle and disappearing; perennial or annual.

1. Leaves arrowshaped, sour; flowers dioecious — *R. acetosélla*
2. Leaves not arrowshaped
a. Leaves sour; flowers dioecious — *R. paucifólius*
b. Leaves not sour; flowers mostly perfect
(1) Valves of the fruit, i. e. the 3 inner enlarged sepals, 10-30 cm. wide, usually reddish
(a) Valves 15-30 mm. wide — *R. venósus*
(b) Valves 10-15 mm. wide
x. Valves ovate; achene 5-6 mm. long — *R. hymenosépalus*
y. Valves reniform; achene 10 mm. long — *R. salínus*
(2) Valves of the fruit less than 10 mm. wide

(a) One or more of the valves with a swelling on the midvein
x. Edge of the valves fringe-toothed
(x) One of the valves warted; lower leaves heart-shaped at base *R. obtusifólius*
(y) All the valves warted; lower leaves tapering at base *R. persicáris*
y. Edge of valves entire, not fringe-toothed
(x) All three valves warted
m. Leaves curly at edge *R. crispus*
n. Leaves flat, not curly at edge *R. brittánica*
(y) One valve only warted
m. Pedicels about the length of the valves *R. altíssimus*
n. Pedicels 2-4 times as long as the valves *R. patiéntia*
(b) All valves without warts, the edge often toothed *R. occidentális*

CHENOPODIÁCEAE GOOSEFOOT FAMILY

Sepals 2-5, united, sometimes none, rarely 1, petals none, stamens 2-5, rarely 1, ovary 1-celled, styles 1-3, fruit a 1-seeded utricle; flowers small, green or greenish, rarely colored, perfect, monoecious or dioecious, usually in dense clusters; annual or perennial herbs, rarely shrubs, with alternate rarely opposite simple entire to lobed often fleshy leaves.

1. Leaves present; stem not jointed
a. Leaves fleshy, linear, terete or nearly so, entire
(1) Shrub; flowers monoecious; fruit winged SARCOBATUS
(2) Herbs; flowers perfect
(a) Fruit winged; leaves spiny-tipped SALSOLA
(b) Fruit wingless; leaves not spiny
x. Calyx white-hairy KOCHIA
y. Calyx smooth, greenish DONDIA
b. Leaves hardly fleshy, flat, toothed or entire
(1) Flowers or most of them with both stamens and pistils
(a) Fruit horizontally winged CYCLOLOMA
(b) Fruit not winged

x. Calyx of 1 sepal
(x) Leaves arrow-shaped, 3-lobed — MONOLEPIS
(y) Leaves linear, entire — CORISPERMUM
y. Calyx of 2-5 united sepals
(x) Leaves thread-like, entire — KOCHIA
(y) Leaves linear-oblong to ovoid, mostly toothed or lobed — CHENOPODIUM
(2) Flowers with stamens or pistils alone
(a) Fruits densely long-silky — EUROTIA
(b) Fruits not long-silky
x. Fruiting bracts flat, united by the edges at their bases to beyond the middle — ATRIPLEX
y. Fruiting bracts folded, completely united by the edges into a sack
(x) Leaves entire; sack entire, ovoid to round — GRAYIA
(y) Leaves wavy-toothed; sack hastate, 2-toothed at tip — SUCKLEYA
2. Leaves none; stems jointed — SALICORNIA

ÁTRIPLEX Linné 1753 SALTBUSH
(The Latin name)
Pl. 10, fig. 1-5.

Sepals 3-5, united in the stamen flowers, none in the pistil flowers, petals none, stamens 3-5, ovary 1-celled, stigmas 2, fruit 1-seeded, enclosed in two scales or bracts, which are often winged, crested or warted; flowers of two sorts, in spikes or head-like clusters; leaves alternate, simple, often silvery-scurfy; annual or perennial, the latter usually shrubby.

1. Plants shrubby, at least the base woody and persistent
a. Fruits with broad wings; shrubs 1-5 ft. high
(1) Bracts of the fruit with 4 toothed wings; leaves oblong to oblanceolate — *A. canéscens*
(2) Bracts extended above the fruit in a broad wing; leaves ovoid to obovoid — *A. confertifólia*
b. Fruits not winged, the bracts crested, warty or lobed; low shrubs 1-5 dm. high
(1) Bracts longer than broad
(a) Leaves linear; stems 1-2 dm. — *A. corrugata*
(b) Leaves broad; stems 2-5 dm. — *A. nuttálli*
(2) Bracts broader than long — *A. obováta*

2. Plants herbaceous, annual
   a. Bracts of the fruit united only at the base
      (1) Bracts ovoid or orbicular, thin, the fruit appearing broadly winged — *A. horténsis*
      (2) Bracts triangular, thick, often warted — *A. pátula*
   b. Bracts united beyond the middle
      (1) Fruiting bracts 3-4 mm. long
         (a) Bracts horned and warted — *A. argéntea*
         (b) Bracts smooth, toothed — *A. truncáta*
      (2) Fruiting bracts 1-2 mm. long
         (a) Bracts entire, united at the edges — *A. ováta*
         (b) Bracts 3-toothed, free at the edges — *A. Wólfii*

CHENOPÓDIUM Linné 1753 GOOSEFOOT, LAMB'S QUARTERS

(Gr. *chen*, goose, *podion*, little foot, from the leaf)

(Blitum L.)

Pl. 8, fig. 3.

Sepals 2-5, somewhat united, somewhat fleshy, occasionally colored, petals none, stamens 1-5, ovary 1-celled, styles 2-3, fruit 1-seeded, enclosed in the calyx; flowers perfect, usually in spikes or heads; leaves alternate, simple, usually toothed or lobed; mostly annual.

1. Leaves silvery-mealy, at least below
   a. Leaves coarsely toothed or lobed, lance-ovate to ovoid
      (1) Plants low and spreading, much branched at the base, 2-15 in. high
         (a) Leaves oblong or lance-oblong, each edge sharply 3-5-toothed — *C. gláucum*
         (b) Leaves triangular-ovate, mostly 3-lobed — *C. incánum*
      (2) Plants tall, erect, 2-8 ft. high; leaves ovoid, toothed or lobed — *C. álbum*
   b. Leaves entire, or nearly so, linear to lance-oblong — *C. leptophýllum*
2. Leaves green, not silvery-mealy
   a. Leaves pinnatifid, sticky-hairy
      (1) Flowers single, 5 mm. wide, on forking branches — *C. cornútum*
      (2) Flowers densely clustered, 1-1.5 mm. wide, on spike-like stems — *C. bótrys*
   b. Leaves smooth

PLATE 10

GOOSEFOOT FAMILY

1–2. Atriplex canescens: Salt Bush; 1, fruiting branch; 2, staminate flower cluster
3, 5. Atriplex nuttalli
4. Atriplex confertifolia
6–8. Sarcobatus vermiculatus: Greasewood; 6, fruits; 7, staminate cluster; 8, spine
9. Kochia americana
10. Eurotia lanata
11. Grayia brandegei
12. Grayia spinosa
13. Corispermum hyssopifolium: Bugseed
14. Dondia depressa: Salt Blite
15. Monolepis nuttalliana
16. Cycloloma atriplicifolium: Tumble Weed
17. Salsola kali: Saltwort, Russian Thistle
18. Salicornia herbacea: Glasswort

(1) Flowers in ball-like heads, forming an open spike, usually pink or red in fruit *C. capitátum*
(2) Flowers in more open clusters, greenish
(a) Leaves 2-lobed, broadly arrow-shaped, rarely toothed, very thin *C. fremónti*
(b) Leaves sharply several-toothed or lobed, thicker
x. Flower clusters much branched, leafless; leaves 2-4 inches long; stems 2-8 ft. high *C. hýbridum*
y. Flower clusters little branched, leafy; leaves .5-2 in. long; stems 1-3 ft. high *C. rúbrum.*

Corispérmum Linné 1753 Bugseed

(Gr. *koris,* bug, *sperma,* seed)
Pl. 10, fig. 13.

Sepals 1 (rarely 2) green, petals none, stamens 1-3, rarely more, ovary 1-celled, ovoid, styles 2, fruit 1-seeded, with an acute or winged margin; flowers small, solitary in the upper axils; leaves alternate, entire, narrow 1-nerved; annual.

Stem much branched, .5-2 ft. high; leaves 2-5 .cm. long, 2-4 mm. wide *C. hyssopifólium*

Cyclolóma Moquin 1840 Tumble Weed

(Gr. *kyklos,* circle, *loma,* fringe, from the calyx wing)
Pl. 10, fig. 16.

Sepals 5, united, green, petals none, stamens 5, ovary 1-celled, styles 2-3, fruit 1-seeded, partly enclosed by the winged calyx, flowers small, sessile, in panicled spikes; leaves alternate, petioled, toothed; annual.

Bush-like, 1-3 ft. high; leaves 1-4 in. long *C. atriplicifólium*

Dóndia Adanson 1763 Salt Blite

(Named for Dondi, an Italian naturalist)
(Sueda Forskal)
Pl. 10, fig. 14.

Sepals 5, united, green, petals none, stamens 5, ovary 1-celled, styles 2, fruit 1-seeded, enclosed by the ridged or slightly winged calyx; flowers perfect or polygamous, solitary or clustered in the upper axils; leaves alternate, narrow, thick, entire, sessile; annual or perennial.

1. One or more sepals strongly ribbed or keeled: stems erect or spreading — *D. deprêssa*
2. Sepals not ribbed or keeled
   a. Woody perennial — *D. móquini*
   b. Annual herb — *D. diffúsa*

EURÓTIA Adanson 1763 EUROTIA

(Gr. *eurotios,* mouldy, from the dense hairiness)

Pl. 10, fig. 10.

Sepals 4 in the stamen flowers, united, bracts none, stamens 4, exserted, sepals none in the pistil flowers, bracts 2, united, densely covered with long, silky hairs, ovary 1-celled, ovoid, hairy, styles 2, exserted, fruit 1-seeded; flowers monoecious or dioecious, in heads or spikes in the axils of the leaves; leaves alternate, entire, narrow, perennial.

Stems .5-3 ft. high; leaves revolute, .5-2 in. long — *E. lanáta*

GRÁYIA Hooker and Arnott 1841 GRAYIA

(Named for the American botanist, Gray)

Pl. 10, fig. 11-12.

Sepals 4-5, united, petals none, stamens 4-5, ovary 1-celled, style jointed at base, stigmas 2, fruit compressed, round winged; flowers dioecious, in racemes or spikes; leaves alternate or clustered, entire; spiny shrubs.

1. Leaves spatulate to obovate; fruit 8-10 mm. wide — *G. spinósa*
2. Leaves linear-spatulate; fruit 4-5 mm. wide — *G. brandégei*

KÓCHIA Roth 1799 KOCHIA

(Named for Koch, a German botanist)

Pl. 10, fig. 9.

Sepals 5, united, petals none, stamens 3-5, ovary 1-celled, style 1, stigmas 2, fruit oblong, 1-seeded, enclosed by the calyx; flowers perfect or pistillate, clustered in the axils; leaves alternate, sessile, narrow, entire; perennial or annual.

Stems .5-1.5 ft. high, long-hairy to smooth — *K. americána*

MONÓLEPIS Schrader 1830 MONOLEPIS

(Gr. *monos,* one, *lepis,* scale, from the single sepal)

Pl. 10, fig. 15.

Sepals 1, petals none, stamens 1, ovary 1-celled, styles 2, slender, fruit

1-seeded, flat; flowers polygamous or perfect in small axillary clusters; leaves small, narrow, alternate, entire, toothed or lobed; annual.

Stems 3-10 in. high; leaves usually 3-lobed or hastate, 1-5 cm. long *M. nuttalliána*

Salicórnia Linné 1753 Glasswort

(Lat. *sal.* salt, *cornu,* horn, from its home and form)
Pl. 10, fig. 18.

Sepals 3-4, united, petals none, stamens 2, or 1, ovary 1-celled, styles 2, fruit enclosed by the spongy calyx; flowers in clusters of 3-7, mostly hidden beneath the opposite scale-like leaves; annual or perennial fleshy herbs with round apparently leafless branches.

Stems forked, 3-18 in. high; fruiting spikes 1-3 in. long, 2-4 mm. wide *S. herbácea*

Sálsola Linné 1753 Saltwort, Russian Thistle

(Lat. *salsus,* salty, *-ola,* little, from its original home)
Pl. 10, fig. 17.

Sepals 5, united, petals none, stamens 5, ovary 1-celled, styles 2, fruit 1-seeded, flattened, enclosed by the winged calyx, flowers small, solitary in the axils or sometimes several; leaves stiff, prickle-pointed; annual or perennial bushy herbs.

Stems much branched, 1-3 ft. high; leaves 1-5 cm. long *S. káli*

Sarcobátus Nees 1839 Greasewood

(Gr. *sarkos,* fleshy, *batos,* thorn, from the fleshy leaves and thorny stems)
Pl. 10, fig. 6-8.

Sepals lacking in stamen flowers, petals none, stamens 2-5 together, under shield-shaped, spirally arranged scales; sepals 2, united in the pistil flowers, fused with the bases of the stigmas, and with a border which expands into a leathery horizontal wing in fruit, ovary 1-celled, stigmas 2, awl-shaped, roughened, fruit 1-seeded; flowers monoecious or dioecious, the stamen-flowers in terminal spikes, the pistil-flowers solitary in the axils, or rarely several together; leaves alternate, linear, fleshy, entire, sessile, branches spiny; shrubs.

Stems 1-10 ft. high; leaves 2-5 cm. long, 2-4 cm. wide *S. vermiculátus*

Súckleya Gray 1875 Suckleya

(Named for the American naturalist, Suckley)

Sepals 4-5, united, petals none, stamens 4-5, ovary 1-celled, fruit with crested margin and 2-toothed tip; flowers monoecious, in axillary clusters; leaves roundish, toothed; annual.

Stems spreading, 8-12 in. long; leaves 1-3 cm. long *S. petioláris*

AMARANTACEAE AMARANTH FAMILY

Sepals 3-5, often united, rarely none, petals none, stamens 3-5, ovary 1-celled, style 1 or none, stigmas 1-3, fruit a 1-seeded utricle or achene; flowers greenish, or purplish, with papery bracts, in dense terminal or axillary clusters; mostly annual herbs with alternate or opposite simple leaves.

1. Leaves alternate; plants green
   - a. Calyx always present — Amarantus
   - b. Calyx none in the pistil flowers — Acnida
2. Leaves opposite; plant gray-woolly or gray-hairy
   - a. Flowers in terminal spikes, densely woolly — Froelichia
   - b. Flowers in small axillary clusters — Cladothrix

Amarántus Linné 1753 Amaranth, Pigweed

(Gr. *a-*, not, *marantos*, withered, from the papery bracts)

Pl. 9, fig. 21-22.

Sepals 3-5, separate, greenish or purplish, petals none, stamens 3-5, ovary 1-celled, stigmas 2-3, fruit a utricle splitting circularly or remaining closed, 2-3-beaked; flowers usually with 3 bracts, in dense terminal spikes or in axillary clusters; leaves alternate, simple, entire or wavy; annual.

1. Flowers in terminal spikes 1-6 in. long
   - a. Leaf axils with 2 spines — *A. spinósus*
   - b. Leaf axils not spiny
     - (1) Spikes stout, 1-3 cm. thick — *A. retroflexus*
     - (2) Spikes slender, .5-1 cm. thick
       - (a) Top of fruit falling off like a lid
         - x. Bracts beneath the flower 3 — *A. hýbridus*
         - y. Bract single — *A. powélli*
       - (b) Fruit remaining closed
         - x. Bracts spiny, twice as long as the sepals — *A. pálmeri*
         - y. Bracts not spiny, about as long as the sepals — *A. tórreyi*

2. Flowers in small axillary clusters
   a. Stems prostrate; sepals 4-5 — *A. blitoides*
   b. Stems erect; sepals 3 — *A. graecizans*

ACNÍDA Linné 1753 ACNIDA, WATER-HEMP

(Gr. *a-*, without, *knide*, nettle, from its lack of spines)

Pl. 9, fig. 20.

Sepals 5 in the stamen flowers, green, papery, erect, longer than the bracts, petal none, stamens 5; sepals and petals lacking in the pistil flowers, ovary 1-celled, ovoid, stigmas 2-5, warted or plumy, fruit 1-seeded, flowers small, 1-3-bracted, in terminal and axillary spikes, or clustered in the axils; leaves alternate, petioled, thin; annual.

Stems 1-8 ft. high; leaves lanceolate or lance-ovate — *A. tamariscina*

CLADÓTHRIX Nuttall 1849

(Gr. *klados*, branch, *thrix*, hair, from the star-shaped hairs)

Sepals 5, united, petals none, stamens 5, ovary 1-celled, globose, style short, stigma globose or 2-lobed, fruit 1-celled, 1-seeded, flowers small, solitary or clustered in the axils; leaves opposite, entire; annual or perennial.

Stems prostrate or spreading, 4-12 in. long; leaves ovate to round — *C. lanuginosa*

FROELÍCHIA Moench 1794 FROELICHIA

(Named for Froelich, a German botanist)

Pl. 9, fig. 19.

Sepals 5, united, densely woolly, petals none, stamens 5, united, ovary 1-celled, stigma 1, globose or tufted, fruit enclosed in the winged or crested calyx; flowers perfect, in dense spikes; leaves opposite sessile entire or wavy; woolly annuals.

1. Stems 1.5-4 ft. high; spikes opposite — *F. floridana*
2. Stems .5-1.5 ft. high; spikes mostly alternate — *F. gracilis*

NYCTAGINACEAE FOUR-O'CLOCK FAMILY

Sepals 4-5, corolla-like, united into a bell-shaped, tubular or salver-form calyx, petals none, stamens 3-5, ovary 1-celled, 1-ovuled, style 1, stigma globose, fruit grooved or winged; flowers in terminal or axillary clusters in an involucre of separate or united bracts; leaves simple entire.

1. Leaves below the flowers, i. e. involucral bracts, separate — ABRONIA

2. Leaves below the flowers united and calyx-like
   a. Stamens 5; involucre bell-shaped; fruit not ribbed — MIRABILIS
   b. Stamens 3; involucre saucer-shaped
      (1) Fruit smooth, not ribbed — ALLIONIELLA
      (2) Fruit hairy, ribbed or warted — ALLIONIA

ABRÓNIA Jussieu 1774 ABRONIA

(Gr. *abros*, pretty, from the flowers)

Pl. 9, fig. 15-16.

Sepals 5, united into an elongated, tubular or funnelform calyx, white to pink, petals none, stamens 3-5, ovary 1-celled, style slender, fruit dry, 1-5 winged, with netted veins; flowers in many-flowered involucres, solitary or clustered on long axillary stalks; leaves opposite, petioled, thick, entire; annual or perennial.

1. Flowers white or greenish-white; fruits narrowly winged; perennials
   a. Flowers white, 2-3 cm. long; wings 2-5 — *A. frágrans*
   b. Flowers greenish, 1.5-2 cm. long; wings mostly 5 — *A. elliptica*
2. Flowers pinkish to reddish; fruits broadly winged; annuals
   a. Flowers 4-5 mm. wide, 1.5-2 cm. long, reddish-green — *A. micrántha*
   b. Flowers 8-10 mm. wide, 3-4 cm. long, pinkish — *A. cyclóptera*

ALLIÓNIA Loefling 1788 ALLIONIA

(Named for Allioni, an Italian botanist)

(Oxybaphus L'Hér.)

Pl. 8, fig. 1.

Sepals 5, united into a bell-shaped calyx, corolla-like, rose-purple, petals none, stamens 3-5, ovary 1-celled, fruit 1-seeded, club-shaped, strongly ribbed, fine-hairy; flowers in loose terminal panicles, involucre of 3-5 partially united bracts, 3-5-flowered, becoming enlarged and net-veined after flowering; leaves opposite.

1. Involucre 5-lobed; fruit wingless
   a. Stem with long shaggy hairs — *A. hirsúta*
   b. Stem smooth, at least not shaggy
      (1) Leaves linear to lanceolate — *A. lineáris*

PLATE 11

POPLARS

1. Populus angustifolia: Narrowleaved Cottonwood
2. Populus acuminata: Rydberg's Cottonwood
3, 5. Populus deltoides: Cottonwood
4. Populus tremuloides: Aspen
6. Populus balsamifera: Balsam Poplar

(2) Leaves ovate — *A. nyctagínea*
2. Involucre 3-lobed; fruit winged — *A. incarnáta*

ALLIONIÉLLA Rydberg 1902
(Diminutive of Allionia)

Sepals mostly 5, corolla-like, united into a bell-shaped tube, petals none, stamens 3, ovary 1-celled, stigma globose, fruit a ribbed achene; flowers usually 3 in a saucer-shaped involucre; leaves opposite simple entire; perennial.

Flowers rose-purple, 1 cm. long; leaves heart-shaped, sticky — *A. oxybaphoides*

MIRÁBILIS Linné 1753 FOUR-O'CLOCK
(Lat. *mirabilis*, wonderful, from the flowers)
(Quamoclidion DC.)
Pl. 8, fig. 2.

Sepals mostly 5, corolla-like, united into a funnelform tube, rose-purple, petals none, stamens 5, ovary 1-celled, stigma globose, fruit an achene without ribs; flowers usually 5-6 in a bellshaped calyx-like involucre; leaves opposite, simple and entire; perennial.

Flowers rose-red, 4-5 cm. long; leaves ovate, smooth *M. multiflóra*

SALICACEAE WILLOW FAMILY

Sepals 0, petals 0, stamens 1-60 ovary 1-celled, stigmas 2, often 2-4-cleft, fruit a small capsule, splitting into 2-4 parts, seeds many, tiny, cottony; flowers in catkins, the stamen and pistil flowers on different trees; trees or shrubs with alternate simple leaves.

1. Trees, mostly with rounded or ovate leaves; buds covered with several scales — POPULUS
2. Shrubs, or sometimes trees, mostly with lanceolate or lance-oblong leaves; buds covered with a single scale — SALIX

PÓPULUS Linné 1753 POPLAR, COTTONWOOD, ASPEN
(L. *populus*, poplar, probably from the root **pal*, to shake)
Plate 11.

Sepals and petals none, but the disk often cup-like, stamens 6-60, ovary 1-celled, stigmas 2-4, entire or lobed, fruit 2-4-valved, smooth or hairy:

flowers appearing before the leaves in red-brown or yellowish hanging catkins with fringed scales; leaves alternate simple, usually broad; trees.

1. Leaves with much flattened petioles
   a. Leaves rounded, short-pointed, entire or finely toothed — *P. tremuloides*: aspen
   b. Leaves broadly triangular, long-pointed, coarsely toothed — *P. deltoides* cottonwood
2. Leaves with round or roundish petioles
   a. Leaves broadly ovate or rounded, whitish beneath — *P. balsamífera*
   b. Leaves lanceolate to lance-ovate, green beneath
      (1) Leaves blunt or acute, 5-15 cm. long, 1-4 cm. wide — *P. angustifólia*
      (2) Leaves long-pointed, 5-10 cm. long, 2-5 cm. wide — *P. acuminàta*

SÁLIX Linné 1753 WILLOW

(L. *salix*, willow, or sallow, the old English name of the willow)

Plates 12-13.

Sepals and petals none, stamens 1-10, usually 2, ovary 1-celled, stigmas 2, fruit 2-valved, smooth or hairy; flowers appearing before the leaves in gray, greenish or yellow catkins, with entire usually hairy scales; leaves alternate, simple, mostly narrow; ours mostly shrubs.

1. Stems low and creeping, mat-like, 1-4 in. high — *S. reticuláta*
2. Stems taller, 1-50 feet high
   a. Leaves smooth or nearly so on both sides when mature
      (1) Leaves linear, linear-oblong or lance-linear — *S. longifolia*
      (2) Leaves broader, lanceolate to obovate
         (a) Shrubs
            x. Young twigs with a bluish bloom — *S. irroràta*
            y. Young twigs without a bluish bloom; leaves oblong-lanceolate
               (x) Leaves entire, or mostly so
                  m. Leaves lanceolate to lance-ovate — *S. chlorophýlla*
                  n. Leaves obovoid — *S. nuttálli*

PLATE 12

WILLOWS

1. Salix longifolia:
   a, staminate catkin
   b, pistillate catkin
   c, pistillate flower
2. Salix reticulata
3. Salix chlorophylla
4. Salix irrorata
5. Salix discolor
6. Salix monticola
7. Salix wolfii
8. Salix nuttalli

PLATE 13

WILLOWS

1. Salix glaucops
2. Salix geyeriana
3. Salix rostrata
4. Salix nigra
5. Salix amygdaloides
6. Salix cordata
7. Salix candida
8. Salix lasiandra

(y) Leaves toothed
m. Leaves lanceolate
(m) Fruits hairy — *S. díscolor*
(n) Fruits smooth
h. Stipules small and glandular, or none, — *S. lasiándra*
i. Stipules large, scarcely glandular — *S. cordáta*
n. Leaves oblanceolate or elliptic to obovoid
(m) Leaves smooth beneath, acute — *S. montícola*
(n) Leaves hairy beneath, blunt as a rule — *S. nuttálli*
(b) Trees
x. Leaves narrowly lanceolate, short-petioled — *S. nígra*
y. Leaves broadly lanceolate, or lance-ovate, long-petioled — *S. amygdaloídes*
b. Leaves persistently hairy
(1) Twigs densely white-hairy; leaves linear-oblong — *S. cándida*
(2) Twigs not densely white-hairy
(a) Fruits densely white-woolly; leaves lanceolate to ovoid — *S. gláucops*
(b) Fruits merely hairy
x. Leaves narrowly lanceolate to oblanceolate — *S. geyeriána*
y. Leaves lance-oblong to obovoid — *S. rostráta*
(c) Fruits smooth — *S. wólfii*

ERICALES HEATH ORDER

PIROLÁCEAE WINTERGREEN FAMILY

Sepals 4-5, united, petals 4-5, separate, stamens 8-10, ovary 4-5-celled, style short or slender, often turned downward, stigma 5-lobed, or 5-crenate; fruit a capsule; flowers solitary or in racemes or corymbs; evergreen perennials with simple, entire petioled leaves.

1. Flower solitary — Moneses
2. Flowers several to many
a. Flowers in a raceme; leaves basal — Pirola
b. Flowers in a corymb; leaves on the stem — Chimaphila

PÍROLA Linné 1753 WINTERGREEN
(Lat. *pirum*, pear, *ola*, little, from the leaves)
Pl. 14, fig. 1-4; pl. 16, fig. 7.

Sepals 5, petals 5, concave, sessile, white, yellowish, pink or purple, stamens 10, ovary 5-celled, style straight or declined, slender or thickened at the summit, stigma 5-lobed, capsule subglobose, 5-lobed, 5-celled, 5-valved from the base; flowers nodding, in terminal racemes; leaves basal; perennial.

1. Flowers pink or rose-purple; leaves roundish, often heart-shaped at base — *P. uliginósa*
2. Flowers greenish to white, rarely pinkish
   a. Style curved
      (1) Leaves mottled with gray above — *P. pícta*
      (2) Leaves not mottled
         (a) Leaf blades shorter than the petioles — *P. chlorántha*
         (b) Leaf blades longer than the petioles — *P. ellíptica*
   b. Style straight
      (1) Style enclosed in corolla; leaves rounded — *P. mínor*
      (2) Style projecting beyond corolla; leaves ovate — *P. secúnda*

MONÉSES Salisbury 1821 MONESES
(Gr. *monos*, one, *hesis*, joy, from the single flower)
Pl. 14, fig. 5.

Sepals 4-5, petals 4-5, white or pink, stamens 8 or 10, ovary 4-5-celled, globose, style straight, club-shaped at summit, stigma 4-5-lobed, capsule subglobose, 4-5-celled, 4-5-valved from the summit; flowers terminal, solitary; leaves petioled, fine-toothed, opposite or whorled in 3's; perennial.

Stems 1-8 in. high; leaves ovate to round, .5-3 cm. long; flowers nodding, 1-2 cm. wide — *M. uniflóra*

CHIMÁPHILA Pursh 1814 PIPSISSEWA
(Gr. *cheima*, winter, *philos*, loving)
Pl. 14, fig. 6.

Sepals 5, petals 5, white or purplish, stamens 10, ovary 5-celled, 5-lobed, globose, style very short, obconic, stigma large, round, 5-crenate, capsule erect, globose, 5-lobed, 5-celled, 5-valved from the top; flowers spreading or nodding in terminal corymbs; leaves opposite, or whorled, evergreen, short-petioled, toothed; perennial.

Stems 3-10 in. high; leaves lanceolate to ovate, 1-3 in. long; flowers 1-2 cm. wide — *C. umbellàta*

PLATE 14

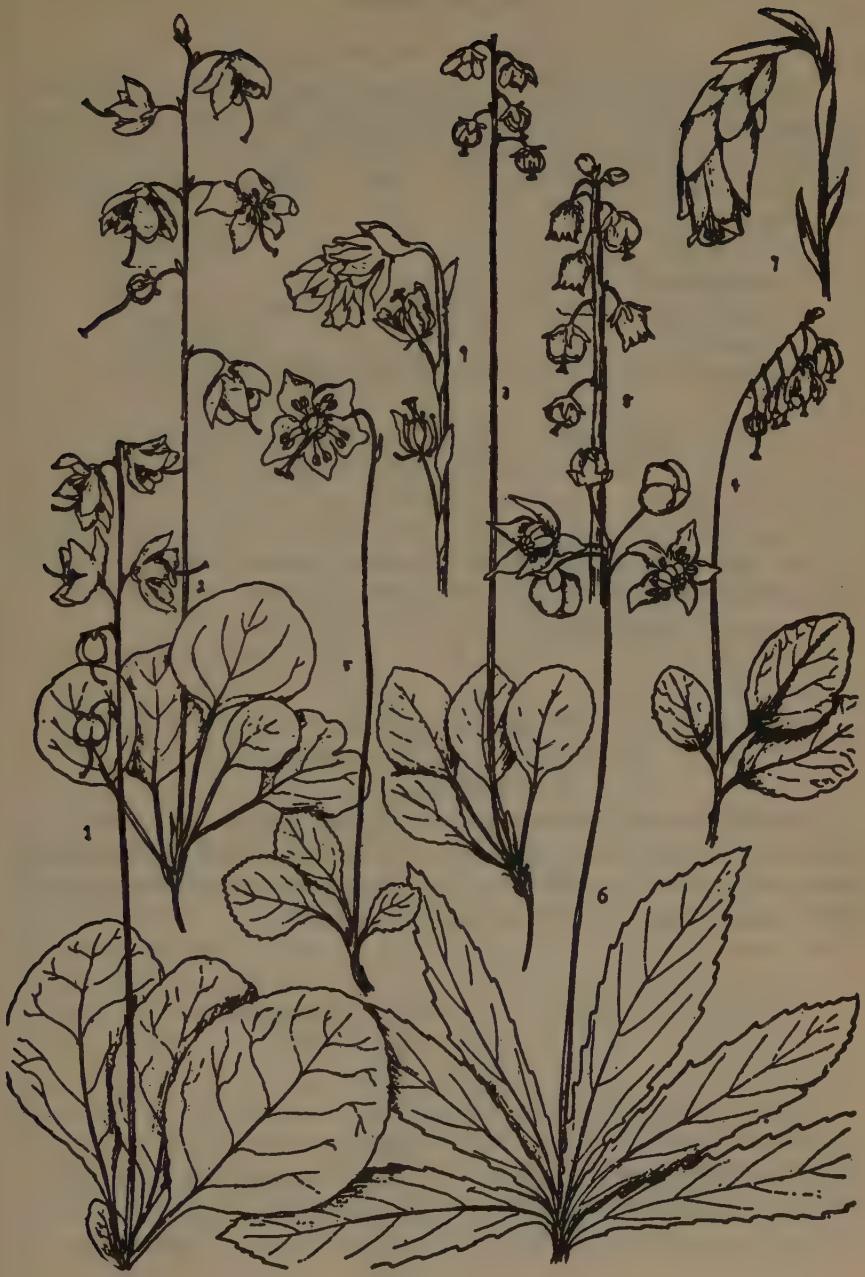
WINTERGREENS AND INDIAN PIPES

WINTERGREEN FAMILY

1. Pirola elliptica: Wintergreen
2. Pirola chlorantha
3. Pirola minor
4. Pirola secunda
5. Moneses uniflora
6. Chimaphila umbellata: Pipsissewa

INDIAN PIPE FAMILY

7. Monotropa uniflora: Indian Pipe
8. Pterospora andromedea: Pine Drops
9. Hypopitys multiflora: Pinesap



MONOTROPACEAE INDIAN PIPE FAMILY

Sepals 2-6, united at the base, deciduous, petals 3-6, united or separate, stamens 6-12, ovary 1-6-celled, 4-6-lobed, stigma globose or shield-shaped, capsule 4-6-lobed, or terete, 1-6-celled, 4-6-valved; flowers terminal, solitary or clustered; leaves reduced to scales or lacking; humus-plants or saprophytes.

1. Flower solitary, nodding — MONOTROPA
2. Flowers clustered
   a. Cluster 1-4 in. long; petals separate, falling away — HYPOPITYS
   b. Cluster 6-20 in. long; petals united, persistent — PTEROSPORA

MONÓTROPA Linné 1753 INDIAN PIPE

(Gr. *monos*, one, *tropa*, turn, from the nodding stem)

Pl. 14, fig. 7.

Sepals 2-4, deciduous, petals 5-6, white, separate, stamens 10-12, ovary 5-celled, style 1, short, thick, stigma funnelform, capsule 5-celled, 5-valved, erect; flowers solitary, nodding; bracts yellowish or red; succulent herb.

Stems white to reddish, 2-15 in. high; flowers .5-1 in. long — *M. uniflóra*

HYPÓPITYS Adanson 1763 PINESAP

(Gr. *hypo*, beneath, *pitys*, fir, from its habitat)

Pl. 14, fig. 9.

Sepals 3-5, petals 3-5, white, yellowish or red, stamens 6-10, ovary 3-5-celled, style slender, stigma funnelform, capsule 3-5-celled, 3-5-valved, erect; flowers in a terminal, nodding one-sided raceme which soon becomes erect.

Stems usually clustered, 4-12 in. high; flowers 8-15 mm. long — *H. multiflóra*

PTERÓSPORA Nuttall 1818 PINE DROPS

(Gr. *pteron*, wing, *spora*, seed)

Pl. 14, fig. 8.

Sepals 5, united, petals 5, united, reddish, stamens 10, included, ovary sub-globose, 5-lobed, 5-celled, style short columnar, stigma globose, 5-lobed, capsule globose, 5-lobed, 5-celled, 5-valved; flowers nodding in racemes.

Stems red-brown, 1-5 ft. high; flowers 5-10 mm. wide — *P. andromedéa*

ERICACEAE HEATH FAMILY

Sepals 4-5, separate or united, petals 4-5, separate or united, stamens 4-10, ovary 2-5-celled, stigma globose or shield-shaped, fruit a capsule, berry or drupe; flowers solitary or clustered; shrubs, or perennial herbs with simple leaves.

1. Petals separate — LEDUM
2. Petals united
   a. Leaves in 4 rows, overlapping, blunt awl-shaped — CASSIOPE
   b. Leaves alternate, flat, spreading
      (1) Corolla flat, saucer-shaped — KALMIA
      (2) Corolla bell- or urn-shaped
         (a) Flowers 4-parted; stamens 8 — MENZIESIA
         (b) Flowers 5-parted; stamens 10
            x. Low erect shrubs with linear leaves. — PHYLLODOCE
            y. Creeping shrubs with broad leaves
               (x) Leaves entire; flowers in terminal clusters — ARCTOSTAPHYLUS
               (y) Leaves toothed; flowers solitary, axillary — GAULTHERIA

ARCTOSTÁPHYLUS Adanson 1763 BEARBERRY, KINNIKINNIC

(Gr. *arktos*, bear, *staphyle*, grape)

Pl. 16, fig. 10.

Sepals 4-5, united at base, petals 4-5, white or pink, united, stamens 8-10, included, ovary 4-10-celled, style slender, fruit a drupe, with 4-10 seed-like nutlets coherent into a solid stone; flowers nodding, stalked, in terminal racemes, panicles or clusters; leaves alternate, petioled, firm, persistent, evergreen; creeping shrub.

Stems creeping; leaves oblong to spatulate, 1-3 cm. long; flowers 7-10 mm. long — *A. uva-ursi*

CASSÍOPE Don 1834 CASSIOPE

(Named for Cassiope)

Pl. 15, fig. 5.

Sepals 4-5, petals 4-5, white or pink, united, stamens 8-10, included, ovary 4-5-celled, style 1, stigma, single, capsule globose or ovoid, 4-5-valved, each valve 2-cleft at the apex; flowers with stalks, solitary, nodding,

PLATE 15

HEATHS AND BLUEBERRIES

HEATH FAMILY

1. Menziesia ferruginea
2. Kalmia glauca
3. Ledum glandulosum: Labrador Tea
4. Phyllodoce empetriformis: Mountain Heath
5. Cassiope hypnoides
6. Gaultheria humifusa

BLUEBERRY FAMILY

7-8. Vaccinium myrtillus: Blueberry
9. Vaccinium occidentale

terminal or axillary; leaves small, sessile, densely crowded, entire; low tufted branching heath-like evergreen shrubs.

Stems tufted, moss-like, 1-5 in. high; leaves 2-5 mm. long; flowers 6-8 mm. wide *C. hypnoides*

Gaulthéria Linné 1753

(Named for Gaultier, a Canadian botanist)
Pl. 15, fig. 6.

Sepals 5, petals 5, white, red or pink, united into an urn- or bell-shaped corolla, stamens 10, included, stigma obtuse, entire, ovary 5-celled, 5-lobed, calyx becoming fleshy and at length surrounding the capsule, forming a berry-like fruit; flowers axillary, solitary or in racemes; leaves alternate, leathery, persistent, evergreen; shrubs.

Stems creeping, flower branches 1-4 in. high; leaves oval to roundish, 12-15 mm. long *G. humifúsa*

Kálmia Linné 1753 Kalmia

(Named for Kalm, a Swedish botanist)
Pl. 15, fig. 2.

Sepals 5, petals 5, lilac-purple, united into a saucer-shaped corolla, stamens 10, shorter than the corolla, ovary 5-celled, style slender, stigma depressed globose, capsule subglobose, obscurely 5-lobed, 5-celled, 5-valved from the summit; flowers in umbels or corymbs or solitary, or 2-3 together in the axils; leaves entire, evergreen, leathery, alternate, opposite, or whorled in 3's; shrubs.

Stems .5-2 ft. high; leaves oblong .5-2 in. long; flowers 10-20 mm. wide *K. glaúca*

Lédum Linné 1753 Labrador Tea

(Greek name of a plant)
Pl. 15, fig. 3.

Sepals 5, petals 5, white, stamens 5 or 10, exserted, ovary ovoid, scaly, 5-celled, style slender, stigma 5-lobed, capsule oblong, 5-celled, 5-valved from the base; flowers numerous in terminal umbels or corymbs; leaves alternate, thick, short-petioled, oblong or linear, rolled back at the margins, fragrant when crushed; evergreen and resinous shrubs.

Stems 2-5 ft. high; leaves 1-2 in. long *L. glandulósum*

MENZIÉSIA Smith 1791 MENZIESIA

(Named for Menzies, an English naturalist)

Pl. 15, fig. 1.

Sepals 4, petals 4, greenish purple, united into an urn-shaped or globose corolla, stamens 8, included, ovary mostly 4-celled, style slender, stigma 4-lobed or 4-toothed, capsule subglobose or ovoid, 4-celled, 4-valved; flowers solitary; leaves alternate, entire, deciduous; shrubs.

Stems 2-6 ft. high; leaves oblong to elliptic, somewhat rusty — *M. ferruginea*

PHYLLÓDOCE Salisbury 1806 MOUNTAIN HEATH

(The name of a sea-nymph)

Pl. 15, fig. 4.

Sepals 5, petals 5, pink, blue or purple, sometimes yellow, united into a bell-shaped corolla, constricted at the throat, stamens 10, included, ovary 5-celled, style slender, included, stigma obscurely 5-lobed or globose, capsule subglobose, or globose-oblong, 5-valved to about the middle; flowers long-stalked, nodding, in terminal umbels; leaves small, crowded, linear, obtuse, leathery, evergreen; low branching shrubs.

1. Corolla rose-red, 5-10 mm. long — *P. empetrifórmis*
2. Corolla yellowish, 3-5 mm. long — *P. glanduliflóra*

VACCINIÁCEAE BLUEBERRY FAMILY

Sepals 4-5, united, petals 4-5, united (rarely separate) into a globose, urn-, bell-shaped, or tubular corolla, deciduous, stamens 8-10, upon the ovary or at the base of the corolla, ovary inferior, 2-10-celled, style slender, stigma simple, or minutely 4-5-lobed or 4-5-toothed, ovules solitary or several in each cavity, fruit a berry or drupe, globose, cells 1-several-seeded, or the drupe containing several nutlets; flowers clustered or solitary; leaves alternate simple; shrubs or small trees.

VACCÍNIUM Linné 1753 BLUEBERRY, CRANBERRY

(The Latin name)

Pl. 15, fig. 7-9.

Sepals 4-5, united into a globose, hemispheric, or top-shaped tube, not angled, united to the ovary, persistent, petals 4-5, white, pink or red, united into an urn-shaped, bell-shaped or cylindric corolla, stamens 8-10, ovary 4-5-celled, or 8-10-celled by false partitions, style straight, stigma

small, fruit a many-seeded berry; flowers in terminal or lateral racemes or clusters, or rarely solitary in the axils; leaves alternate, often leathery, shrubs or small trees.

1. Flowers solitary; corolla 5-lobed
   a. Branches with line-like angles
      (1) Stems 2-15 in. high; berries black to red — *V. myrtíllus*
      (2) Stems 1-3 ft. high; berries black — *V. membranáceum*
   b. Branches round, not angled — *V. caespitósum*
2. Flowers 2-4 in a cluster; corolla 4-lobed — *V. occidentále*

PRIMULALES PRIMROSE ORDER

PRIMULACEAE PRIMROSE FAMILY

Sepals 4-9 (usually 5), united, petals 4-9, (usually 5), united, stamens as many as the petals, and attached to them, ovary 1-celled, style 1, stigma 1, globose, fruit a 2-6-valved capsule; flowers terminal or axillary, solitary or clustered; annual or perennial herbs with alternate or opposite, mostly simple, leaves.

1. Petals present
   a. Flowers white. pink or rose-purple, never bright yellow
      (1) Flowering stems leafy only at base
         (a) Corolla lobes reflexed; flowers usually hanging — DODECATHEON
         (b) Corolla lobes not reflexed; flowers erect or ascending
            x. Flowers pink, lilac or rose-purple
               (x) Corolla lobes notched or cleft; fruits many-seeded — PRIMULA
               (y) Corolla lobes entire; fruits 1-2-seeded — DOUGLASIA
            y. Flowers white, rarely yellowish or pinkish — ANDROSACE
      (2) Flowering stems leafy throughout; flowers white, in racemes — SAMOLUS
   b. Flowers bright yellow
      (1) Flowers solitary — STEIRONEMA
      (2) Flowers in spikes — NAUMBERGIA
2. Petals absent, the calyx white, pink or purplish — GLAUX

Andrósace Linné 1753 Androsace

(Gr. *androsakes*, a kind of plant)
Pl. 16, fig. 5.

Sepals 5, united, petals 5, white, rarely yellowish or pinkish, united into a salver- or funnel-form corolla, the tube not longer than the calyx, stamens 5, included, ovary 1-celled, style 1, stigma globose, capsule top-shaped, ovoid, or globose, 5-valved from the apex; flowers in terminal umbels with basal involucre; leaves small, simple, basal; low annual or perennial.

1. Corolla 5-10 mm. wide, white to pinkish or yellow; perennial, the rosettes connected — *A. chamaejásme*
2. Corolla 2-4 mm. wide, white
   a. Fruiting calyx top-shaped, the teeth lanceolate, longer than the capsule
      (1) Bracts of the involucre ovate to oblong — *A. occidentális*
      (2) Bracts of the involucre lanceolate to linear; plant very variable, dwarf rosettes or tall and diffuse — *A. septentrionális*
   b. Fruiting calyx globose, the teeth ovate-triangular, shorter than the capsule — *A. filifórmis*

Douglásia Lindley 1828

(Named from Douglas, an English botanist)
Pl. 16, fig. 9.

Sepals 5, united, petals 5, red to purple, united in a tube, stamens 5, ovary 1-celled, style slender, capsule top-shaped, 1-2-seeded; flowers solitary or 2-3 in a terminal cluster; leaves small, crowded, entire, linear or awl-shaped; perennial.

Stems tufted; leaves 5-12 mm. long; flowers 1-3 — *D. montána*

Gláux Linné 1753 Seawort

(Gr. *glaukos*, sea-green)
Pl. 16, fig. 8.

Sepals 5, united, pink or white, petals none, stamens 5, ovary 1-celled, style slender, stigma globose, capsule globose-ovoid, beaked, 5-valved, at the top; flowers minute, nearly sessile, axillary; leaves opposite, entire, obtuse, small, fleshy; succulent perennial.

Stems spreading or erect, 1-8 in. high; leaves linear to oblong, 3-15 mm. long — *G. maritima*

PLATE 16

PRIMROSES—HEATHS

PRIMROSE FAMILY

1. Primula farinosa: Primrose
2. Steironema ciliatum: Loosestrife
3. Primula parryi: Primrose
4. Dodecatheon meadia: Shooting Star
5. Androsace chamaejasme
6. Primula angustifolia: Primrose
8. Glaux maritima: Seawort
9. Douglasia montana

WINTERGREEN FAMILY

7. Pirola uliginosa: Wintergreen

HEATH FAMILY

10. Arctostaphylus uva-ursi: Bearberry, Kinnikinnic

ROCKY MOUNTAIN FLOWERS

PLATE 16.

Naumbúrgia Moench 1802 Loosestrife

(Named for Naumburg, a German botanist)

Sepals 5-7, petals 5-7, yellow, united, the tube exceedingly short, stamens 5-7, exserted, ovary 1-celled, style slender, stigma capitate, capsule 5-7-valved, flowers in axillary spike-like racemes or heads; leaves opposite, sessile, lance-shaped, entire; perennial.

Stems 1-3 ft. high; leaves lanceolate, 2-4 in. long; flowers 4-6 mm. wide — *N. thyrsiflóra*

Dodecátheon Linné 1753 Shooting Star

(Gr. *dodeka,* twelve, *theoi,* gods)
Pl. 16, fig. 4.

Sepals 5, united, petals 5, united at base, pink, or rose-purple to white, strongly reflexed, stamens 5, an exserted cone on the throat of the corolla, ovary 1-celled, style slender, exerted, stigma globose, capsule oblong or cylindric, erect, 5-6-valved at the apex or splitting to the base; flowers nodding, in terminal umbels; leaves basal, simple; perennial.

Stems 2 in.-3 ft. high; leaves usually oblanceolate to obovate, 2-10 in. long; flowers 1.5-3 cm. long — *D. meádia*

Prímula Linné 1753 Primrose, Cowslip

(Lat. *primus,* spring, *-ula,* small, from the time of blooming)
Pl. 16, fig. 1, 3, 6.

Sepals 5, united, petals 5, pink, lilac or rose-purple, united into a funnel- or salver-form corolla, the tube longer than the calyx, the lobes sometimes notched or 2-cleft, stamens 5, included, ovary 1-celled, style slender, stigma globose, capsule oblong-ovoid, or globose, 5-valved at the summit; flowers in terminal umbels, or racemes, sometimes single; leaves basal, simple; perennial.

1. Leaves densely white mealy below; corolla lobes deeply cleft — *P. farinósa*
2. Leaves green on both sides; corolla lobes merely notched
   a. Plant low, 1-5 in.; leaves .5-2 in. long; flowers 1-few, 1-2 cm. long — *P. angustifólia*
   b. Plant tall, 6-25 in.; leaves 3-10 in. long; flowers several to many, 2-3 cm. long — *P. párryi*

Sámolus Linné 1753 Brookweed

(The ancient name)

Sepals 5, united, petals 5, white, united, bell-shaped, stamens 5, ovary 1-celled, capsule globose or ovoid, 5-valved from the summit; flowers in terminal racemes or panicles; leaves alternate, entire; perennial.

Stems .5-1.5 ft. high; leaves obovate, 1-3 in. long; flowers 1-2 mm. wide — *S. floribúndus*

Steirónéma Rafinesque 1820 Loosestrife

(Gr. *steiros,* sterile, *nema,* thread, from the sterile stamens)

Pl. 16, fig. 2.

Sepals 5, petals 5, yellow, stamens 5, sterile stamens 5, ovary 1-celled, globose, capsule 5-valved, flowers axillary on slender stalks; leaves opposite or whorled, simple, entire; perennial.

Stems 1-4 ft. high; leaves ovate to lance-ovate, 2-5 in. long; flowers 1-2.5 cm. wide — *S. ciliátum*

PLANTAGINACEAE PLANTAIN FAMILY

Sepals 4, united, petals 4, united, papery, stamens 4 or 2, inserted on the tube or throat of the corolla, ovary 1-2-celled, or falsely 3-4-celled, style slender, simple, ovules 1-several in each cell, fruit a pod or capsule opening by a lid, or a nutlet, seeds 1-several in each cavity; flowers small, perfect, polygamous or monoecious, in dense terminal spikes or heads, or rarely solitary; annual or perennial stemless or short-stemmed herbs with basal, opposite or alternate leaves.

Plantágo Linné 1753 Plantain

(Lat. *planta,* sole, *-ago,* like, from the shape of the leaf)

Pl. 20, fig. 1.

Sepals 4, united, petals 4, greenish or purplish, united into a salverform corolla, the tube cylindric or constricted at the throat, stamens 4 or 2, ovary 2-celled or falsely 3-4-celled, ovules 1-several in each cell, fruit opening by a lid; flowers in terminal spikes or heads; leaves basal or alternate; stemless or short-stemmed herbs.

1. Leaves linear, 1-5 mm. wide
   a. Leaves 3-6 mm. wide, gray woolly; spikes 5-6 mm. wide; stamens 4 — *P. púrshi*
   b. Leaves .5-1 mm. wide, minutely hairy; spikes 2 mm. wide; stamens 2 — *P. elongáta*

2. Leaves lanceolate to ovate, 1-10 cm. wide
   a. Leaf bases in a mass of red-brown wool — *P. eriópoda*
   b. Leaf bases without red-brown wool
      (1) Leaves lanceolate
         (a) Leaves 3-12 in. long; seeds 2 — *P. lanceoláta*
         (b) Leaves 1-3 in. long; seeds 4 — *P. tweédyi*
      (2) Leaves ovate to round
         (a) Pod ovoid, splitting circularly about the middle — *P. májor*
         (b) Pod oblong splitting circularly near the base — *P. rugélli*

GENTIANALES GENTIAN ORDER

GENTIANÁCEAE GENTIAN FAMILY

Sepals 4-7, united, petals 4-7, united into a funnel-, bell-, club-, or saucer-shaped corolla, stamens 4-14, ovary 1-2-celled, style simple or none, stigma entire or 2-lobed or 2-cleft, capsule mostly splitting by 2 valves; flowers in terminal or axillary clusters, or solitary at the ends of stems or branches; herbs with opposite, entire, rarely whorled leaves.

1. Style short and persistent, or none
   a. Corolla flat, saucer-shaped
      (1) Flowers green; leaves 3-6 in a whorl; stem 2-5 ft. high — FRASERA
      (2) Flowers purple, blue or white; leaves opposite; stems .5-2 ft. high
         (a) Petals with a fringed nectary at base — SWERTIA
         (b) Petals without fringed nectaries — PLEUROGYNE
   b. Corolla tubular or bell-shaped — GENTIANA
2. Style slender, thread-like, falling away at maturity
   a. Corolla bell-shaped — EUSTOMA
   b. Corolla salver-shaped — ERYTHRAEA

ERYTHRAÉA Necker 1790 CENTAURY

(Gr. *erythraios,* red, from the color)

Sepals 4-5 united, petals 4-5, pink, white or yellow, united into a salverform corolla, stamens 4-5, ovary 1-celled, style slender, stigma 2-lobed,

PLATE 17

ASHES—MILKWEEDS

OLIVE FAMILY

1. Fraxinus lanceolata: Green Ash
2. Adelia neo-mexicana

BUCKBEAN FAMILY

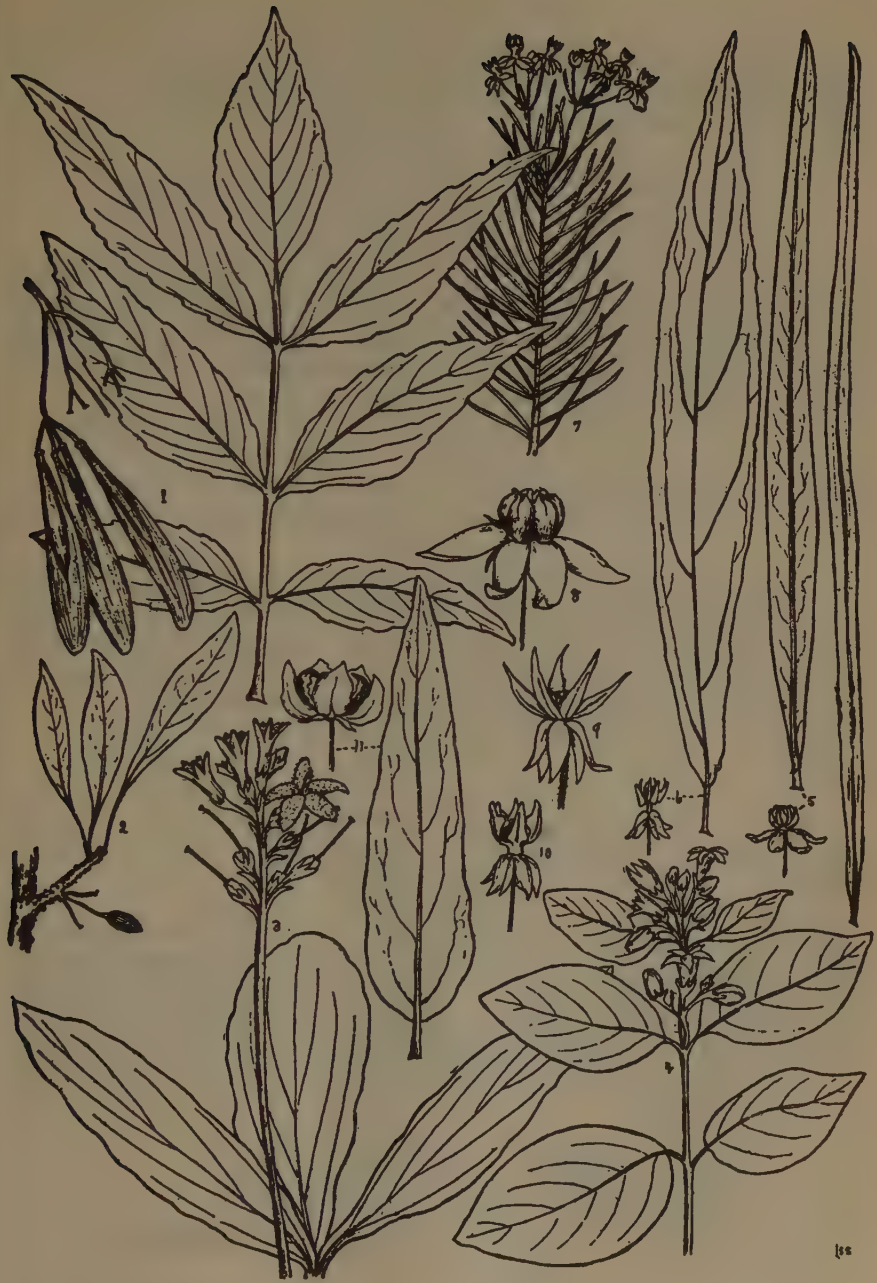
3. Menyanthes trifoliata: Buckbean

DOGBANE FAMILY

4. Apocynum androsaemifolium: Dogbane

MILKWEED FAMILY

5. Acerates viridiflora
6. Asclepias incarnata: Milkweed
7. Asclepias pumila
8. Asclepias cryptoceras
9. Asclepias speciosa
10. Asclepias halli
11. Asclepiodora decumbens: Milkweed



capsule oblong-ovoid, or spindle-shaped, 2-valved; flowers in cymes or spikes; leaves sessile, or clasping the stem; annual or biennial.

Stems 4-12 in. high; leaves oblong to lance-linear *E. arizónica*

EUSTÓMA Salisbury 1806 EUSTOMA

(Gr. *eu-*, good, true, *stoma*, mouth, from the open corolla)

Pl. 18, fig. 5.

Sepals 5-6, united, petals 5-6, blue, purple or white, united into a broad, bell-shaped corolla, stamens 5-6, ovary 1-celled, style slender, stigma 2-cleft, capsule oblong or ovoid, 2-valved; flowers long-stalked, axillary and terminal, solitary or in panicles; leaves opposite, sessile or clasping; annual.

Stems 4-15 in. high; leaves oblong to elliptic, 1-2 in. long *E. andréwsi*

FRÁSERA Walter 1788 FRASERA, GREEN GENTIAN

(Named for Fraser, a botanical collector)

Pl. 18, fig. 3.

Sepals 4, united, petals 4, greenish, each bearing 1-2 fringed glands, united into a saucer-shaped corolla, stamens 4, ovary ovoid, 1-celled, style slender or short, but distinct, stigma 2-lobed or nearly entire, capsule ovoid, leathery, somewhat compressed, 2-valved; flowers in terminal open or crowded panicles; leaves opposite or whorled; perennial or biennial.

Stems 1-5 ft. high; leaves linear to obovate, 4-12 in. long *F. speciósa*

GENTIÁNA Linné 1753 GENTIAN

(Named for Gentius, king of Illyria)

Pl. 18, figs. 1-2, 4, 6.

Sepals 4-7, (usually 5), united, petals 4-7, blue, purple, yellow or white, united into a tube-, bell-, salver-, or funnel-shaped corolla, stamens 4-7, on the corolla, included, ovary 1-celled, style short or none, stigma 2-cleft, capsule 2-valved; flowers solitary or clustered, terminal or axillary; leaves opposite (rarely whorled) entire, sessile or short-petioled; perennial.

1. Corolla with a shorter lobe or fold between the main lobes
   a. Plants low, .5-3 in. high; flowers small, .5-1 cm. long; leaves tiny
      (1) Flowers white or whitish; fruit stalked; at 7-10000 ft. *G. húmilis*

(2) Flowers bright blue; fruit scarcely stalked; at 10-14000 ft. *G. prostráta*

b. Plants .5-2 ft. high; flowers large, 2-5 cm. long

(1) Corolla greenish-yellow, purple dotted; at 10-14000 ft. *G. frígida*

(2) Corolla blue or purple

(a) Corolla open

x. Corolla widely open, 3-5 cm. long, mostly 1.5-2 cm. wide *G. calycósa*

y. Corolla narrowly open, 2-3 cm. long, 1 cm. or less wide *G. áffinis*

(b) Corolla nearly or completely closed *G. andrêwsi*

2. Corolla without lobes or folds between the main lobes, the latter fringed at the margin or at the base

a. Lobes fringed along the margin; flowers 1-2 in. long

(1) Flowers on long leafless stalks; corolla lobes obovoid, dark blue *G. serráta*

(2) Flowers on short stalks, enclosed in 2 leaves; corolla lobes oblong, light blue *G. barbelláta*

b. Lobes usually entire at margin, but fringed at base; flowers .5-2 cm. long

(1) Flowers single on long slender stems bearing a few small leaves; rare *G. tenélla*

(2) Flowers usually many on short stalks from leafy stems; common *G. amarélla*

PLEURÓGYNE Eschscholtz 1825

(Gr. *pleuron*, side, *gyne*, female, from the lateral stigmas)

Sepals 4-5, united at the base, petals 4-5 white to blue, with a pair of narrow appendages at the base of each, united into a saucer-shaped corolla, stamens 4-5, ovary 1-celled, style none, stigma running down the ovary, capsule 2-valved; flowers in terminal narrow racemes or panicles, or solitary at the ends of the slender stalks, leaves opposite; annual.

Stems 4-15 in. high; leaves linear, 2-3 cm. long; flowers 12-25 mm. wide *P. rotáta*

SWÉRTIA Linné 1753 SWERTIA

(Named for Swert, a Dutch botanist)

Pl. 18, fig. 7.

Sepals 4-5, united, petals 4-5, blue, purple, or white, united into a

PLATE 18

GENTIAN FAMILY

1. Gentiana amarella: Gentian
2. Gentiana serrata: Fringed Gentian
3. Frasera speciosa: Green Gentian
4. Gentiana barbellata: Fringed Gentian
5. Eustoma andrewsi
6. Gentiana calycosa: Gentian
7. Swertia perennis

ROCKY MOUNTAIN FLOWERS

PLATE 18.

saucer-shaped corolla, stamens 4-5, ovary 1-celled, stigma 2-lobed, or divided, capsule ovate; flowers in a compact panicle; leaves alternate, simple, the lower with margined petioles; perennial.

Stems 3-20 in. high; leaves 1-5 in. long; flowers in open to dense clusters, 1-3 cm. wide; petals 4 or 5 *S. perénnis*

MENYANTHACEAE BUCKBEAN FAMILY

Sepals 5, united, petals 5, united into a funnelform, or saucer-shaped corolla, stamens 5, on the corolla, ovary 1-celled, fruit a capsule or closed; flowers regular and perfect, in clusters; perennial aquatic or marsh herbs with basal or alternate entire crenate or 3-foliate leaves.

MENYÁNTHES Linné 1753 BUCKBEAN

(Gr. *men,* month, *anthos,* flower)

Pl. 17, fig. 3.

Sepals 5, united, petals 5, white or purplish, united into a short funnelform corolla, fringed or bearded within, stamens 5, on the tube of the corolla, disk of 5 glands below the ovary, ovary 1-celled, style awl-shaped, stigma of 2 flat plates, capsule oval; flowers in racemes or panicles on long lateral stalks; leaves alternate, long-petioled, 3-foliate, basal; perennial marsh herb with creeping root-stocks.

Leaflets oblong to obovate, 1.5-3 in. long; flowers 10-12 mm. long *M. trifoliáta*

OLEACEAE OLIVE FAMILY

Sepals 2-4 (or none) united into a calyx, petals 2-4 (or none) separate or united, stamens 2-4, on the corolla, ovary 2-celled, fruit a capsule, sometimes a winged fruit (samara), drupe, or berry; flowers perfect, polygamous or dioecious, in terminal or axillary panicles, cymes or clusters, trees or shrubs with opposite or alternate, simple or pinnate, entire or dentate leaves.

1. Leaves pinnate or simple; fruits winged FRAXINUS
2. Leaves simple; fruits berry-like ADELIA

FRÁXINUS Linné 1753 ASH

(The Latin name)

Pl. 17, fig. 1.

Sepals 4 (or none) united, petals none or 2-4, separate or united in pairs at the base, greenish, stamens 2 (rarely 3 or 4), ovary 2-celled, with

2 ovules in each cavity, stigma 2-cleft, fruit a flat samara, winged at the apex only or all around, usually 1-seeded; flowers small, dioecious or polygamous, rarely perfect, clustered, appearing before or with the leaves; leaves odd-pinnate or simple; trees.

1. Tree 20-50 ft. high; leaflets lanceolate, 3-8 in. long — *F. lanceoláta*
2. Shrub 8-20 ft. high; leaves round to ovate, 1-2 in. wide — *F. anómala*

Adélia P. Brown 1756

(Gr. *adelos*, inconspicuous, from the flowers)
(Forestiera Poir.)
Pl. 17, fig. 2.

Sepals 4 or none, united, petals none or 1 or 2, small, deciduous, yellow or greenish, stamens 2-4, ovary 2-celled, ovules 2 in each cell, style slender, stigma 2-lobed, fruit an oblong or subglobose drupe with 1 or rarely 2 seeds; flowers small, dioecious or polygamous, in clusters, short racemes or panicles from scaly buds produced at the leaf-axils of the preceding season, appearing before or with the leaves; leaves opposite, simple, toothed or entire; shrubs.

Stems 3-10 ft. high; leaves 2-3 cm. long — *A. neo-mexicána*

APOCYNACEAE DOGBANE FAMILY

Sepals 5, united into a tube, petals 5, united, stamens 5, inserted on the corolla tube, ovary of 2 distinct carpels, style and stigma 1, fruit of 2 long follicles; flowers solitary or clustered; perennial herbs with alternate or opposite simple, usually entire leaves.

1. Leaves opposite — Apocynum
2. Leaves alternate — Amsonia

Amsónia Walter 1788 Amsonia

(Named for Amson, an American physician)

Sepals 5, united, petals 5, blue or bluish, united, stamens 5, in the throat of the corolla, ovary of 2 carpels connected above by the style, fruit of 2 erect, cylindrical several-seeded follicles; flowers in cymes; leaves alternate, entire; perennial.

Stems .5-2 ft. high; leaves linear to oblong, 1-2 in. long; flowers 1-2 cm. long — *A. texána*

Apócynum Linné 1753 Dogbane

(Gr. name of the dogbane; *apo,* from, *kyon, kynos,* dog)

Pl. 17, fig. 4.

Sepals 5, united, petals 5, white to pink, united into a bell-shaped tube, bearing 5 triangular scales, alternating with the 5 stamens, ovary of 2 carpels, stigma obscurely 2-lobed, fruit of 2 long terete follicles, seeds with a hairy apex; flowers in terminal and axillary cymes; leaves opposite, entire; perennial.

1. Corolla pink or pinkish, rarely white, with tube longer than calyx and lobes turned back *A. androsaemifólium*
2. Corolla white or greenish, tube shorter than calyx and lobes erect *A. cannábinum*

ASCLEPIADÁCEAE MILKWEED FAMILY

Sepals 5, united, petals 5, united into a bell-, urn-, saucer-, or funnel-shaped corolla, a 5-lobed or 5-parted crown between the corolla and the stamens and united to one or the other, stamens 5, inserted on the corolla, usually near its base, filaments short, stout, ovary of 2 carpels, styles 2, short, connected at the summit by the shield-shaped stigma, fruit 2 follicles, flowers perfect, regular, in umbels; perennial herbs, vines or shrubs, mostly with milky juice and opposite, alternate or whorled leaves.

1. Hoods of the crown without horn or crest Acerates
2. Hoods with horn or crest within
   a. Leaves mostly opposite or whorled; hoods with an incurved horn Asclepias
   b. Leaves alternate; hoods with a crest Asclepiodora

Acerátes Elliott 1817 Acerates

(Gr. *a-,* without, *keras,* horn, from the hornless hoods)

Pl. 17, fig. 5.

Sepals 5, united, petals 5, green or purplish, united, turned back, crown-column very short, crown of 5 somewhat pitcher-shaped hoods, stamens 5, pollen masses solitary in each sac, oblong, hanging, stigma 5-lobed; flowers in umbels, terminal or short-stalked, leaves thick, alternate or opposite; perennial herbs.

1. Flower clusters on stalks 1-5 cm. long; leaves very long and narrow *A. auriculáta*
2. Flower clusters stalkless or nearly so
   a. Hoods 3-toothed at tip; leaves elongated, linear *A. angustifólia*

b. Hoods entire at tip; leaves ovate to lance-linear — *A. viridiflóra*

Asclépias Linné 1753 Milkweed

(Named for Asklepios, the Greek god of medicine)

Pl. 17, fig. 6-10.

Sepals 5, united, petals 5, greenish-white to pink or purple, united, turned back, crown-column generally present, crown of 5 concave erect or spreading hoods, each bearing within a slender or awl-shaped incurved horn, stamens 5, pollen-masses solitary in each sac, hanging, stigma nearly flat, 5-angled or 5-lobed, follicles usually thick, taper-pointed; flowers in terminal or axillary umbels; leaves opposite, whorled or rarely alternate, entire; perennial.

1. Leaves opposite or mostly so
   - a. Leaves linear, 5-10 mm. wide — *A. brachystéphana*
   - b. Leaves broader, lanceolate to round
     - (1) Flowers red; leaves lanceolate, 1.5-4 cm. wide — *A. incarnáta*
     - (2) Flowers greenish, white, yellowish or purplish; leaves lance-ovate to round
       - (a) Leaves lance-ovate, usually velvety-hairy, rather acute — *A. hálli*
       - (b) Leaves broadly ovate to round
         - x. Leaves smooth when mature
           - (x) Petals 1-1.5 cm. long; horns concealed in hoods — *A. cryptóceras*
           - (y) Petals 5-7 mm. long; horns exserted — *A. latifólia*
         - y. Leaves velvety-hairy
           - (x) Hoods long-pointed, 10-15 mm. long; leaves pointed — *A. speciósa*
           - (y) Hoods blunt, 4-5 mm. long; leaves retuse — *A. arenária*
2. Leaves alternate or scattered
   - a. Flowers orange; leaves lanceolate to oblong, hairy — *A. tuberósa*
   - b. Flowers greenish-white; leaves long linear, smooth
     - (1) Plants 2-8 in. high; leaves densely crowded — *A. púmila*
     - (2) Plants 1-2 ft. high; leaves in whorls

(a) Hoods entire — *A. verticillata*
(b) Hoods arrow-shaped — *A. galioides*

Asclepiodóra Gray 1876 Milkweed

(Gr. *Asklepios; doron,* gift)
Pl. 17, fig. 11.

Sepals 5, lance-shaped, petals 5, united into a wheel-shaped corolla, hoods oblong, inserted over the whole of the very short crown-column, curved upward, obtuse, crested within, at least in the upper part, slightly longer than the anther, at the clefts between the hoods a small lobe or appendage, alternating with the anther wings and resembling an inner crown, anthers 5, pollen masses hanging, pear-shaped, follicles ovoid or oblong, erect or ascending on the curved or twice-bent fruiting stalks; flowers in terminal, solitary or clustered umbels; leaves alternate or opposite, entire; perennial herbs.

Stems ascending, .5-2 ft. high; leaves lanceolate, 3-8 in. long; flowers 1.5-2 cm. wide — *A. decúmbens*

POLEMONIALES PHLOX ORDER

POLEMONIÁCEAE PHLOX FAMILY

Sepals 5, united into a tube, petals 5, united into a regular, funnel-form to saucer-shaped corolla, stamens 5, on the tube of the corolla and alternate with its lobes, ovary 3-celled, stigmas 3, fruit a 3-valved capsule; flowers mostly in panicles and cymes, rarely solitary; annual or perennial herbs with alternate or opposite, simple and entire or lobed to pinnate leaves.

1. Leaves opposite and entire — Phlox
2. Leaves usually alternate, mostly pinnatifid to pinnate
   a. Leaves pinnate; corolla bell-shaped — Polemonium
   b. Leaves entire to pinnatifid; corolla tubular to salverform
      (1) Leaves entire
         (a) Ovule one in each cavity — Collomia
         (b) Ovules 2-many in each cavity — Gilia
      (2) Leaves pinnatifid
         (a) Leaves with rigid needle-like lobes — Navarretia
         (b) Leaves with soft spineless lobes — Gilia

Collómia Nuttall 1818 Collomia

(Gr. *kolla*, glue, from the wetted seeds)

Pl. 19, fig. 7.

Sepals 5, united into a cup-shaped or obpyramidal calyx, petals 5, purple, white or reddish, united into a tubular-funnelform or salverform corolla, stamens 5, on the tube of the corolla, ovary 3-celled, ovules 1-few in each cavity, capsule oval to obovoid; flowers in heads or cymes; leaves alternate, mostly entire; annual or rarely perennial.

Stems 2 in. to 3 ft. high; leaves lance-linear to lance-oblong; flowers 10-15 mm. long — *C. lineáris*

Gília Ruiz and Pavon 1794 Gilia

(Named for Gil, a Spanish botanist)

Pl. 19, fig. 3; pl. 20, fig. 5-6.

Sepals 5, united into a bell-shaped or tube-shaped calyx, petals 5, white, red, pink, violet or blue, united into a funnelform or tubular, bell-shaped or rarely salverform corolla, stamens 5, on the corolla, ovary 3-celled, ovules solitary or several in each cell, capsule ovoid or oblong, 3-celled; flowers solitary or clustered; leaves opposite or alternate, entire, or pinnately or palmately cut or dissected; annual, biennial or perennial.

1. Flowers in a panicle, often much branched
   - a. Leaves regularly alternate
     - (1) Flowers more than 1 cm. long, often 3-5 cm.
       - (a) Leaves mostly entire and basal — *G. subnúda*
       - (b) Leaves pinnatifid, the stems leafy
         - x. Corolla lobes narrow, lance-ovate, acute; fruit and calyx nearly equal; flowers red to white — *G. aggregáta*
         - y. Corolla lobes broad, ovate to round; fruit twice as long as calyx; flowers white
           - (x) Corolla 3-5 cm. long, the lobes round — *G. longiflóra*
           - (y) Corolla 1.5-3 cm. long, the lobes somewhat acute — *G. laxiflóra*
     - (2) Flowers 4-12 mm. long
       - (a) Stamens exserted
         - x. Corolla white, dotted, 10-12 mm. long — *G. polyántha*

y. Corolla pale blue or purplish, 4-6 mm. long — *G. pinnatífida*

(b) Stamens included

x. Corolla 4-5 mm. long; seeds unchanged when wet — *G. leptoméria*

y. Corolla 5-10 mm. long; seeds with spirals when wet — *G. inconspícua*

b. Leaves regularly opposite

(1) Stamens hairy — *G. pharnaceoídes*

(2) Stamens smooth — *G. harknéssi*

2. Flowers in a dense spike or head

a. Flowers in an oblong spike 2-8 in. long; leaves linear, mostly entire — *G. spicáta*

b. Flowers in a roundish head

(1) Stems naked, except for the 2 persistent seed leaves, 1-4 in. high; head with an involucre of 4-5 leaves — *G. nudicaúlis*

(2) Stems leafy; heads not involucrate

(a) Corolla tube equalling calyx lobes; heads dense — *G. congésta*

(b) Corolla tube twice as long as calyx; heads loose — *G. púmila*

3. Flowers solitary, or in open corymbs

a. Flowers 1-2 cm. long

(1) Leaves needle-pointed

(a) Leaves alternate, at least above; flowers solitary — *G. púngens*

(b) Leaves opposite — *G. wátsoni*

(2) Leaves not needle-pointed; flowers in corymbs — *G. nuttálli*

b. Flowers 2-4 mm. long

(1) Corolla twice as long as the calyx — *G. tenérrima*

(2) Corolla little longer than the calyx

(a) Stamens equally exserted — *G. minutiflóra*

(b) Stamens unequally exserted — *G. micrántha*

NAVARRÉTIA Ruiz and Pavon 1794

(Named for Navarrete, a Spanish botanist)

Sepals 5, united into a prism-shaped or pyramid-shaped calyx, spiny-tipped, petals 5, white or yellow, united into a tubular funnelform or salverform corolla, stamens 5 on or below the throat of the corolla, ovary

PLATE 19

MORNING GLORIES—PHLOXES

POTATO FAMILY

1. Quincula lobata: Purple Ground-cherry
4. Solanum rostratum: Buffalo Bur

MORNING GLORY FAMILY

2. Ipomoea leptophylla: Bush Morning Glory

PHLOX FAMILY

3. Gilia aggregata
5. Polemonium speciosum
6. Polemonium pulchellum
7. Collomia linearis

ROCKY MOUNTAIN FLOWERS

PLATE

2-3-celled, capsule 1-3-celled; flowers in dense terminal bracted clusters; leaves alternate, spiny and pinnately cut, or the lowest entire; annual.

1. Corolla yellow; leaves sticky — *N. bréweri*
2. Corolla white; leaves not sticky
   a. Corolla 5-6 mm. long — *N. intertéxta*
   b. Corolla 2-3 mm. long — *N. mínima*

PHLÓX Linné 1753 PHLOX

(Gr. *phlox*, flame, name of a red plant)

Pl. 20, fig. 2-4.

Sepals 5, united into a tubular or bell-shaped calyx, petals 5, blue, purple, red or white, united into a salverform corolla, with narrow tube, stamens 5, on the corolla tube, ovary 3-celled, style usually slender, ovules 1-4 in each cavity, fruit an ovoid 3-valved capsule; flowers in terminal cymes or cyme-like panicles; leaves opposite, entire or some of the upper ones alternate; annual or perennial.

1. Leaves densely to sparsely woolly; cushion plants
   a. Corolla tube much longer than calyx
      (1) Leaves awl-shaped, prickly, sparsely woolly — *P. canéscens*
      (2) Leaves ovate, scarcely prickly, densely woolly — *P. bryoídes*
   b. Corolla tube about the length of the calyx — *P. hoódi*
2. Leaves not woolly, but smooth, hairy, or the edge ciliate
   a. Leaves ciliate at the edge, sometimes glandular also; cushion plants
      (1) Leaves less than 1 cm. long; corolla about 1 cm. wide — *P. caespitósa*
      (2) Leaves 1-2 cm. long; corolla 1-2 cm. wide — *P. kélseyi*
   b. Leaves little or not at all ciliate, but smooth, hairy or glandular
      (1) Leaves 1-2 cm. long; stems tufted, somewhat woolly, 1-4 in. high — *P. douglási*
      (2) Leaves 2-5 cm. long; stems rarely tufted, 4-15 in. high, often glandular — *P. longifólia*

POLEMÓNIUM Linné 1753 POLEMONIUM

(The Greek name of a plant)

Pl. 19, fig. 5-6.

Sepals 5, united into a bell-shaped calyx, petals 5, blue, white or

yellow, united into a bell-shaped, or tunnelform corolla, rarely wheel-shaped, stamens 5, inserted near the base of the corolla, ovary ovoid, capsule ovoid, obtuse, 3-valved; flowers in open or close cyme-like panicles; leaves alternate, pinnate; perennials or rarely annuals.

1. Corolla funnelform, 2-3 cm. long, its tube longer than calyx or limb
   a. Leaflets whorled, crowded
      (1) Flowers blue in a dense cluster — *P. confértum*
      (2) Flowers yellowish in an open often interrupted cluster — *P. c. mellitum*
   b. Leaflets two-rowed, often paired — *P. speciósum*
2. Corolla bell-shaped, 1-2 cm. long, its tube about the length of the calyx, and shorter than the limb
   a. Stems spreading, clustered, 1-12 in. high; stem leaves few — *P. pulchéllum*
   b. Stems erect, usually single, 2-4 ft. high, leafy — *P. caerúleum*

CONVOLVULACEAE MORNING GLORY FAMILY

Sepals 5, united, petals 5, united into a funnelform, salverform, or bell-shaped corolla, stamens 5, inserted low down on the tube of the corolla, ovary 2-3-celled with 2 ovules in each cell, or falsely 4-6-celled with a single ovule in each cell, entire or 2-4-divided, styles 1-3, fruit a 2-4-valved capsule or of 2-4 distinct carpels; flowers solitary or in axillary cymes; herbs with twining, trailing or erect stems, and alternate, entire to lobed or dissected leaves.

1. Low silvery-silky herb; styles 2, 2-forked — Evolvulus
2. Stems twining or trailing, or bushy and shrub-like; style 1
   a. Stigmas globose; flowers mostly blue to red — Ipomoea
   b. Stigmas oblong to linear; flowers white or pinkish — Convolvulus

Convólvulus Linné 1753 Bindweed

(Lat. *convolvo*, twine around)

Sepals 5, united, petals 5, pink, purple or white, united into a funnel- or bell-shaped corolla, stamens 5, inserted on the tube of the corolla, included, ovary with 1-2 cavities, ovules 4, style slender, stigmas 2, thread-like, oblong or ovoid, capsule globose or nearly so, 2-4-valved; flowers axillary, solitary or clustered; leaves entire, toothed or lobed, mostly

heart- or arrow-shaped and stalked; perennial with trailing, twining or erect stems.

1. Base of the flower enclosed in 2 sepal-like bracts
   a. Leaves smooth, the basal lobes spreading — *C. sépium*
   b. Leaves hairy, basal lobes not spreading — *C. répens*
2. Base of the flower without sepal-like bracts
   a. Leaves smooth, entire — *C. arvénsis*
   b. Leaves gray-hairy, more or less lobed — *C. incánus*

Evólvulus Linné 1762 Evolvulus
(Lat. *e-*, not, *volvulus*, twining)

Sepals 5, united, petals 5, blue, pink or white, united into a funnel-form, bell-shaped or saucer-shaped corolla, stamens 5, on the corolla, ovary with 2 cavities, style 2-divided to the base or near it, each division deeply 2-cleft stigmas thread-like, capsule globose to ovoid, 2-4-valved, 1-4-seeded; flowers axillary, solitary or in clusters; leaves small, usually entire; annual or perennial.

Stems 4-12 in. high; leaves oblong to spatulate, 5-20 mm. long; flowers 6-12 mm. wide — *E. argénteus*

Ipomóea Linné 1753 Morning Glory
(Gr. *ips, ipos*, worm, *homoios*, like)
Pl. 19, fig. 2.

Sepals 5, united, petals 5, pink, red, blue, purple or white, united into a funnel- or bell-shaped corolla with a more or less plaited tube, stamens 5 on the tube of the corolla, included, ovary with 2-4 cavities and 4-6 ovules, style thread-like, included, stigmas 1 or 2, globose, capsule globose or ovoid, 2-4-valved; flowers axillary, solitary or clustered; leaves entire, heart-shaped or lobed; annual or perennial.

1. Plant bushy, 2-5 ft. high; leaves linear; flowers pink to red — *I. leptophýlla*
2. Plant trailing or climbing; flowers blue to purple or white
   a. Leaves entire, heart-shaped at base — *I. purpúrea*
   b. Leaves 3-lobed — *I. hederácea*

CUSCUTÁCEAE DODDER FAMILY

Sepals 5, separate or united, petals 5, united into a bell-shaped to cylindric tube, the latter usually containing fringed scales alternate with the lobes, stamens 5, alternate with the corolla lobes, ovary 2-celled, ovules

4, styles 2, rarely united below, capsule splitting or remaining closed; flowers usually in dense clusters; thread-like parasites with minute scales in place of leaves, twining about herbs or shrubs.

Cúscuta Linné 1753 Dodder
(Probably of Arabic origin)
Pl. 20, fig. 16.

Characters of the family.

1. Scales within the corolla projecting beyond the tube — *C. umbellata*
2. Scales included in the corolla
   a. Stigmas thread-like; fruit opening circularly — *C. gracilis*
   b. Stigmas shield- or ball-like; fruit remaining closed
      (1) Sepals separate, with similar bracts below them
         (a) Flowers stalked, in loose clusters; bracts entire — *C. cuspidata*
         (b) Flowers sessile, in dense rope-like clusters; bracts finely toothed — *C. glomerata*
      (2) Sepals united
         (a) Flowers sessile or nearly so
            x. Scales within corolla tube ovate, fringed — *C. arvensis*
            y. Scales none or much reduced — *C. polygonorum*
         (b) Flowers stalked
            x. Tips of corolla lobes inflexed
               (x) Fruit enclosed by the corolla — *C. indecora*
               (y) Fruit capped by the corolla — *C. coryli*
            y. Tips of corolla lobes not inflexed
               (x) Scales shorter than corolla-tube, finely fringed all around — *C. cephalanthi*
               (y) Scales equaling or exceeding the corolla-tube, long-fringed at the top — *C. gronovi*

SOLANACEAE POTATO FAMILY

Sepals 5, united, petals 5, united into a saucer-, bell-, funnel-, salver-, or tube-shaped corolla, stamens 5, inserted on the tube and alternate with the lobes of the corolla, ovary with 2 cavities, ovules numerous, style slender, stigma terminal, fruit a berry or capsule; flowers solitary or

clustered; herbs, shrubs or vines with alternate or rarely opposite, entire, toothed, lobed or dissected leaves.

1. Herbs
   a. Calyx inflated and balloon-like in fruit
      (1) Flowers purple, saucer-shaped, erect — QUINCULA
      (2) Flowers yellow or yellowish, bell-shaped, nodding — PHYSALIS
   b. Calyx not balloon-like in fruit
      (1) Corolla saucer-shaped
         (a) Fruiting calyx enclosing the fruit — CHAMAESARACHA
         (b) Fruiting calyx not enclosing the fruit — SOLANUM
      (2) Corolla funnelform or salverform
         (a) Corolla lobes irregular, tube short — HYOSCYAMUS
         (b) Corolla lobes regular, tube long
            x. Fruit prickly — DATURA
            y. Fruit smooth — NICOTIANA
2. Shrubs — LYCIUM

CHAMAESÁRACHA Gray 1876 GROUND SARACHA
(A hybrid, meaning ground Saracha)

Sepals 5, united into a bell-shaped calyx, somewhat enlarged in fruit but not inflated, close-fitting to the berry, not exceeding the berry, petals 5, white or cream-colored, often tinged with purple, united into a saucer-shaped corolla, stamens 5, inserted near the base of the corolla, style slender, somewhat bent, stigma minutely 2-cleft, fruit a berry; flowers solitary or in groups of 2-4 in the axils; leaves entire to pinnately cut, the blade running down on the leaf-stalk; perennial.

Leaves lance-linear to obovate, entire to lobed, variously hairy — *C. corónopus*

DATÚRA Linné 1753 THORN-APPLE, JIMSON WEED
(The Hindoo name)

Sepals 5, united into a long tube splitting circularly near the base which is persistent below the prickly capsule, petals 5, white, purple or violet, united into a funnel-shaped corolla, stamens 5, included or little exserted, filaments thread-like, very long, inserted at or below the middle of the corolla tube, ovary with 2 cavities or 4 by false partitions, style thread-like, stigma slightly 2-lobed, capsule 4-valved from the top or bursting irregularly; flowers solitary, erect, on short stalks; leaves alternate, stalked, entire, wavy-toothed or lobed; annual or perennial.

PLATE 20

PHLOXES—SNAPDRAGONS

PLANTAIN FAMILY

1. Plantago purshi: Plantain

PHLOX FAMILY

2. Phlox bryoides
3. Phlox kelseyi
4. Phlox longifolia
5. Gilia pungens
6. Gilia pinnatifida

WATERLEAF FAMILY

7. Hydrophyllum fendleri: Waterleaf
8. Hydrophyllum capitatum

BORAGE FAMILY

9. Lappula texana
10. Lappula floribunda: Stickseed
11. Krynitzkia glomerata
12. Krynitzkia virgata
13. Krynitzkia sericea
14. Krynitzkia crassisepala

POTATO FAMILY

15. Physalis lanceolata; Ground Cherry

DODDER FAMILY

16. Cuscuta cuspidata: Dodder

SNAPDRAGON FAMILY

17. Chionophila jamesi
18. Besseya plantaginea

1. Flowers white
   a. Flowers 6. 8 in. long; pod nodding, bursting irregularly — *D. meteloides*
   b. Flowers 3-4. 5 in. long; pod erect, 4-valved — *D. stramónium*
2. Flowers violet; pod erect, 4-valved — *D. tátula*

Hyoscýamus Linné 1753 Hog-bean

(Gr. *hyos,* hog, *kyamos,* bean)

Sepals 5, united into an urn- or narrowly bell-shaped calyx, with slender longitudinal grooves or channels, enlarged and enclosing the capsule in fruit, petals 5, greenish yellow with purple veins, united into a funnel-shaped corolla with unequal more or less spreading lobes, stamens 5, on the tube of the corolla, mostly exserted, ovary with 2 cavities, style slender, stigma globose, capsule splitting circularly above the middle; lower flowers solitary in the axils, the upper in a more or less 1-sided spike or raceme; leaves alternate, mostly lobed or pinnately cut; annual, biennial or perennial.

Stems 1-3 ft. high; leaves oblong to ovate in outline, 3-7 in. wide; flowers 1-2 in. wide — *H. níger*

Lýcium Linné 1753

(Named for the country Lycia)

Sepals 3-5, united into a bell-shaped calyx, persisting at base of the berry, petals 5, greenish to purple, united into a bell-shaped or funnel-form corolla, stamens usually 5, ovary 2-celled, stigma globose or 2-lobed, fruit a globose to oblong berry; flowers solitary or clustered, axillary or terminal; leaves alternate, entire; shrub or woody vine, often spiny.

Stems 1-3 ft. high; leaves oblong to oblanceolate, 1-2 in. long — *L. pállidum*

Nicotiána Linné 1753 Tobacco

(Named for a French ambassador, Nicot)

Sepals 5, united into a tube- or bell-shaped calyx, petals 5, white, yellow, greenish or purplish, united into a funnel-, salver-, or nearly tube-shaped corolla, the tube usually longer than the spreading lobes, stamens 5, inserted on the tube of the corolla, ovary with 2 (rarely 4) cavities, style slender, stigma globose, capsule 2-valved or sometimes 4-valved at the top; flowers in terminal racemes or panicles; leaves alternate entire or slightly wavy; annual or perennial.

1. Flowers day-blooming; leaves clasping — *N. trigonophýlla*
2. Flowers night-blooming; leaves stalked — *N. attenuáta*

PHYSÁLIS Linné 1753 GROUND CHERRY
(Gr. *physalis*, bubble, from the inflated calyx)
Pl. 20, fig. 15.

Sepals 5, united into a bell-shaped calyx, enlarged and bladdery-inflated in fruit, membranous, 5-angled or prominently 10-ribbed and netted-veined, wholly enclosing the pulpy berry, petals 5, yellowish or whitish, often with a darker brownish or purplish center, united into an open bell-shaped or rarely saucer-shaped corolla, stamens 5, inserted near the base of the corolla, ovary with 2 cavities, style slender, stigma minutely 2-cleft, fruit a berry; flowers solitary; leaves entire or wavy-toothed; annual or perennial.

1. Perennial, as shown by underground stems and buds
   a. Leaves sticky-hairy — *P. heterophýlla*
   b. Leaves smooth or hairy, but not sticky
      (1) Leaves smooth — *P. longifólia*
      (2) Leaves hairy
         (a) Hairs simple, not branched or star-shaped
            x. Fruiting calyx pyramidal, 5-angled and base deeply sunken — *P. virginiána*
            y. Fruiting calyx ovoid, scarcely angled or sunken at base — *P. lanceoláta*
         (b) Hairs branched or star-shaped
            x. Hairs branched on the lower surface — *P. púmila*
            y. Hairs star-shaped — *P. féndleri*
2. Annual; fruiting calyx sharply 5-angled; hairy or sticky — *P. pruinósa*

QUÍNCULA Rafinesque 1832 PURPLE GROUND-CHERRY
(Name unexplained, probably from *quinque*, five)
Pl. 19, fig. 1.

Sepals 5, united into a saucer-shaped calyx inflated in fruit, sharply 5-angled and netted-veined, enclosing the fruit, petals 5, purplish or violet, united into a flat corolla, 5-sided in outline, veiny, stamens 5, ovary with 2 cavities, fruit a berry; flowers on stalks, most commonly in pairs from the axils, sometimes solitary or in clusters of 3-5; leaves from wavy-margined to pinnately cut, somewhat fleshy; perennial.

Stems spreading or flat, 2-8 in. high; leaves spatulate to ovate, 1-3 in. long; flowers 2-3 cm. wide — *Q. lobáta*

SOLÁNUM Linné 1753 NIGHTSHADE, BUFFALO BUR
(Lat. *sola*, solace, perhaps from use as medicine)
Pl. 19, fig. 4.

Sepals 5, united into a bell- or saucer-shaped calyx, petals 5, white, blue, purple or yellow, united into a saucer-shaped corolla, the lobes plaited, the tube very short, stamens 5, inserted on the throat of the corolla, ovary usually with 2 cavities, stigma small, berry mostly globose, the calyx either persistent at the base or enclosing it; flowers clustered; leaves entire, toothed or pinnately cut; annual or perennial.

1. Flowers white; plants not prickly
   a. Leaves entire to pinnatifid, annuals
      (1) Leaves entire to toothed; berries black — *S. nígrum*
      (2) Leaves pinnatifid; berries green — *S. triflórum*
   b. Leaves pinnate, of 7-9 leaflets; perennial from tubers — *S. jámesi*
2. Flowers yellow or blue; plants prickly
   a. Flowers yellow; fruit prickly; leaves pinnatifid — *S. rostrátum*
   b. Flowers blue or violet, rarely white
      (1) Fruit prickly; leaves pinnatifid — *S. heterodóxum*
      (2) Fruit smooth; leaves entire or toothed — *S. elaeagnifólium*

HYDROPHYLLACEAE WATERLEAF FAMILY

Sepals 5, united, petals 5, united into a funnel-form, salver-form, bell-shaped or saucer-shaped corolla, stamens 5, on the tube or base of the corolla, ovary 2-celled, or 1-celled with 2 placentae, styles 2, separate or partly united, capsule 1-2-celled; flowers in curved cymes, spikes or racemes, or rarely solitary; herbs with alternate or basal, rarely opposite leaves.

1. Styles 2; flowers solitary in the forks of the stem — NAMA
2. Style 1, 2-cleft
   a. Flowers solitary; leaves opposite, at least the lower
      (1) Calyx with bracts between the sepals, not greatly enlarged in fruit — NEMOPHILA
      (2) Calyx without alternating bracts, greatly enlarged in fruit — MACROCALYX
   b. Flowers in clusters
      (1) Corolla lobes imbricate before the flower opens — PHACELIA
      (2) Corolla lobes convolute — HYDROPHYLLUM

HYDROPHÝLLUM Linné 1753 WATERLEAF

(Gr. *hydro-*, water, *phyllon*, leaf, from the splotches on the leaf)

Pl. 20, fig. 7-8.

Sepals 5, united, petals 5, white, blue or purple, united into a tubular to bell-shaped corolla, each lobe with a linear appendage within, which extends to the base of the corolla, stamens 5, exserted, filaments hairy below or at the base, ovary 1-celled, hairy, styles united nearly to the summit, capsule 2-valved, seeds 1-4; flowers in terminal or lateral more or less curved cymes; leaves lobed, pinnately cut or divided; perennial or biennial.

1. Edge of leaflets toothed; flower stalks longer than leaf stalks *H. féndleri*
2. Edge of leaflets entire; flower stalks much shorter than leaf stalks *H. capitátum*

MACRÓCALYX Trew 1761

(Gr. *makros*, large, *calyx*, cup, calyx)

(Ellisia L.)

Sepals 5, united, much enlarged in fruit, petals 5, white or bluish, united into a bell-shaped or nearly cylindric corolla, usually with 5 minute appendages on the tube within, stamens 5, included, ovary 1-celled, styles united below, ovules 2-4 on each of the placentae; flowers solitary or in racemes; leaves opposite or alternate, pinnately divided or 1-3 pinnate; annual.

Stems hairy, 3-10 in. high; leaves pinnately divided, flowers white or bluish *M. nyctélea*

NÁMA Linné 1753 NAMA

(Gr. *nama*, brook, referring to the habitat of some species)

Sepals 5, distinct, petals 5, white or blue, united into a shallow bell-shaped corolla, stamens 5, on the base of the corolla, ovary 2-celled (rarely 3-celled), styles 2 (rarely 3) slender, stigma globose, capsule globose or ovoid; flowers in cyme-like clusters or solitary; leaves alternate, entire, sometimes with spines in their axils; perennial.

Stems 3-8 in. high, hairy; leaves linear; flowers small *N. angustifólium*

NEMÓPHILA Nuttall 1822 NEMOPHILA

(Gr. *nemos*, wood, *philos*, loving)

Sepals 5, united, with a turned-back or spreading appendage in each groove, petals 5, white, blue or variegated, united into a bell-shaped corolla,

usually with 10 small appendages within at the base, stamens 5, included, ovary 1-celled, styles partly united, capsules 2-valved, seeds 1-4; flowers solitary, stalked, lateral or terminal; leaves alternate or opposite, mostly pinnately cleft or lobed; annuals.

Stems spreading or trailing; leaves lobed or divided; flower whitish — *N. parviflóra*

Phacélia Jussieu 1789 Phacelia

(Gr. *phacelos,* cluster)

Pl. 21, fig. 6.

Sepals 5, united, somewhat enlarging in fruit, petals 5, blue, purple, violet, or white, united into a bell-shaped, tubular or funnel-form corolla, stamens 5, attached near the base of the corolla, ovary 1-celled, styles united below, capsule 1-celled, or falsely nearly 2-celled, 2-valved; flowers in terminal curved cymes or racemes; leaves alternate, entire, toothed, lobed, pinnately cut or dissected, the lowest rarely opposite; annual or perennial.

1. Leaves or some of them entire
   - a. Leaves oblanceolate to ovate, entire; perennial — *P. heterophýlla*
   - b. Leaves linear to oblong, often lobed; annual — *P. lineáris*
2. Leaves coarsely toothed to pinnatifid
   - a. Leaves coarsely toothed — *P. integrifólia*
   - b. Leaves divided, often to the midrib
     - (1) Flowers typically in 1-sided curved cymes; sticky annuals — *P. glandulósa*
     - (2) Flowers in an oblong spike; silky-hairy perennials — *P. sericea*

BORAGINACEAE BORAGE FAMILY

Sepals 5, united, petals 5, united, stamens 5, inserted on the tube or throat of the corolla and alternate with the lobes, ovary of 2 2-ovuled carpels, entire or the carpels commonly deeply 2-lobed, making it appear as of 4 1-ovuled carpels, style simple, entire or 2-cleft, fruit mostly of 4 1-seeded nutlets or of 2 2-seeded carpels; flowers in 1-sided spikes, racemes, flat-topped clusters or sometimes scattered; annual, biennial or perennial herbs or shrubs, with alternate, rarely opposite or whorled entire, usually rough or hairy leaves.

1. Fruits bur-like, with hooked prickles; flowers white to light blue — Lappula

2. Fruits smooth or merely toothed
   a. Ovary of 4 nutlets
      (1) Flowers blue or bluish
         (a) Dwarf, 1-5 cm. high, with densely white woolly stems and basal leaves — ERITRICHIUM
         (b) Taller, 1-10 dm. high, not densely white woolly
            x. Nutlets attached laterally to a cone-like receptacle; very common — MERTENSIA
            y. Nutlets attached at their bases; rare — MYOSOTIS
      (2) Flowers white to yellow or greenish
         (a) Corolla funnel-form or salver-form, the lobes spreading; style included
            x. Flowers mostly bright yellow to orange; nutlets attached at their bases — LITHOSPERMUM
            y. Flowers mostly white or greenish, rarely yellow; nutlets attached laterally — KRYNITZKIA
         (b) Corolla tubular, lobes straight; style long exserted — ONOSMODIUM
   b. Ovary entire, not divided into 4 nutlets; flowers white
      (1) Style 2-cleft; stems repeatedly 2-forked — COLDENIA
      (2) Style entire or none; stems not 2-forked — HELIOTROPIUM

COLDÉNIA Linné 1753 COLDENIA

(Named for Colden, an English botanist)

Sepals 5, united, petals 5, white or pink, united into a funnel-form or salver-form tube, stamens 5, ovary 4-celled, stigmas 1-2, fruit of 4 nutlets; flowers in dense lateral and terminal clusters; leaves alternate, entire; annual.

Stems prostrate; leaves ovate or rounded, 4-10 mm. long — *C. nuttálli*

ERITRÍCHIUM Schrader 1820 DWARF FORGET-ME-NOT

(Gr. *eri*, very, *trichios*, hairy)

Pl. 21, fig. 8.

Sepals 5, united, petals 5, white or blue, united into a salver-form corolla, stamens 5, included, ovary 4-divided, style short, fruit of 4 nutlets; flowers in terminal spikes or racemes; leaves linear, entire, the lowest often opposite; perennial.

PLATE 21

BORAGES—WATERLEAFS

BORAGE FAMILY

1. Mertensia sibirica
2. Krynitzkia leucophaea
3. Lithospermum multiflorum: Puccoon
4. Myosotis alpestris: Forget-me-not
5. Mertensia alpina: Alpine Forget-me-not
7. Symphytum officinale: Comfrey
8. Eritrichium argenteum: Dwarf Forget-me-not
9. Lappula floribunda: Stickseed

WATERLEAF FAMILY

6. Phacelia sericea

1
2
3
4
5
6
7
8
9

1. Stems 1-3 in. high; leaves ovate to lanceolate, 3-6 mm. long *E. argénteum*
2. Stems 3-4 in. high; leaves linear, 10-15 mm. long *E. howárdi*

HELIOTRÓPIUM Linné 1753 HELIOTROPE
(Gr. *helios*, sun, *tropos*, turn)

Sepals 5, united, petals 5, blue or white, united into a salvér- or funnel-form corolla, stamens 5, included, ovary entire or 2-4-grooved, style terminal, short or slender, fruit 2-4-lobed, separating into 4 1-seeded nutlets or 2 2-seeded carpels; flowers small, in one-sided spikes or scattered; leaves alternate, mostly entire and stalked; annual.

1. Flowers solitary, white, 1.5-2 cm. long; leaves ovate to lanceolate, hairy *H. convolvuláceum*
2. Flowers in 1-sided spikes, white with yellow eye, 3-5 mm. long; leaves linear to spatulate *H. curassávicum*

KRYNÍTZKIA Fischer & Meyer 1841
(Named for Krynitzki, a Russian botanist)
(Allocarya, Cryptanthe, Oreocarya)
Pl. 20, fig. 11-14; Pl. 21, fig. 2.

Sepals 5, united, petals 5, white, rarely yellow, united into a salver-form corolla, stamens 5, included, ovary 4-divided, style short, fruit of 4 nutlets; flowers in terminal spikes or racemes; leaves linear, entire, the lowest often opposite; annual or perennial.

1. Leaves alternate
   a. Calyx open in fruit; calyx and pedicel persistent
      (1) Fruit globose to ovoid *K. jámesi*
      (2) Fruit oblong-pyramidal
         (a) Corolla tube longer than calyx, and twice longer than corolla lobes; calyx with yellowish hairs and bristles
            x. Corolla white *K. fulvocanéscens*
            y. Corolla yellow or yellowish *K. leucopháea*
         (b) Corolla tube not longer than calyx, and hardly longer than corolla lobes
            x. Leaves of the flower cluster several times longer than the short flower branches; stems strict; flower cluster oblong *K. virgáta*

y. Leaves of the cluster equalling or much shorter than the flower branches
(x) Stems tufted, spreading, 2-8 in. high; lower leaves gray, often silky, upper yellowish, bristly *K. sericea*
(y) Stems rarely tufted, erect, 8-15 in. high; leaves grayish-green, usually very bristly *K. glomerata*
b. Calyx mostly closed in fruit; fruit, calyx and pedicel falling off together
(1) Nutlets of the fruit margined by a wing *K. pterocarya*
(2) Nutlets not winged
(a) Nutlets or some of them, roughened or warted *K. crassisepala*
(b) Nutlets smooth *K. pattersoni*
c. Calyx splitting circularly in fruit, the lobed top falling away; stems 1-5 in. high, white-hairy; leaves linear *K. circumscissa*
2. Leaves opposite, at least the lower; stems prostrate, branched from the base, with single flowers for most of their length, 1-6 in. long *K. californica*

LÁPPULA Moench 1794 STICKSEED
(Lat. *lappa*, bur, *-ula*, little)
Pl. 20, fig. 9-10; Pl. 21, fig. 9.

Sepals 5, united, petals 5, blue or white, united into a salver- or funnel-form corolla, the tube very short, the throat closed by 5 scales, stamens 5, included, ovary 4-lobed, style short, fruit of 4 nutlets, the margins or backs armed with stout, often flattened, barbed prickles, the sides usually with small papillae; flowers in terminal racemes; leaves alternate, narrow, entire; annual or perennial.

1. Racemes with leafy bracts; fruits not deflexed
a. Prickles in 1 row, distinct to variously fused *L. texana*
b. Prickles in 2 rows *L. lappula*
2. Racemes without leafy bracts; fruits deflexed
a. Flowers 2-5 mm. wide; fruits 4-5 mm. wide *L. americana*
b. Flowers 6-10 mm. wide; fruits 6-8 mm. wide *L. floribunda*

LITHOSPÉRMUM Linné 1753 GROMWELL, PUCCOON
(Gr. *lithos*, stone, *sperma*, seed)
Pl. 21, fig. 3.

Sepals 5, united, petals 5, white, yellow, or blue, united into a funnel-

or salver-form corolla, stamens 5, included, inserted on the throat of the corolla, ovary 4-divided, style slender or thread-like, stigma globose or 2-lobed, nutlets 4, or fewer, attached by their bases to the flat receptacles; flowers in leafy-bracted spikes or racemes; leaves alternate, entire, hairy or rough; annual or perennial.

1. Corolla lobes not toothed or fringed
   a. Corolla greenish-yellow, 6-10 mm. long; throat nearly naked — *L. pilósum*
   b. Corolla bright yellow to orange, 1-2 cm. long; throat crested
      (1) Corolla 6-8 mm. wide, bright yellow; at 6-10000 ft. — *L. multiflórum*
      (2) Corolla 8-20 mm. wide, orange-yellow; at 3-5000 ft.
         (a) Stem and leaves soft gray-hairy; corolla tube naked at base within — *L. canéscens*
         (b) Stem and leaves rough-hairy; corolla tube bearded at base within — *L. gmelíni*
2. Corolla lobes toothed or fringed
   a. Corolla 2.5-4 cm. long; lobes fringed — *L. linearifólium*
   b. Corolla 8-20 mm. long; lobes toothed
      (1) Corolla 8-10 mm. long — *L. breviflórum*
      (2) Corolla 15-20 mm. long — *L. mandanénse*

Merténsia Roth 1797 Mertensia, Forget-me-not

(Named for Mertens, a German botanist)

Pl. 21, fig. 1, 5.

Sepals 5, united, petals 5, blue, purple or white, united into a tube-, funnel- or trumpet-shaped corolla, stamens 5, inserted on the tube of the corolla, included or scarcely exserted, ovary 4-divided, style thread-like, fruit of 4 nutlets, wrinkled when mature and attached above their bases; flowers in panicles, cymes or racemes; leaves alternate; perennial.

1. Filaments as long or longer than the anthers, and as broad; stems 6 in. to 5 ft. high, at 5-10000 ft.
   a. Calyx lobes oblong, obtuse, about ¼-⅕ the length of the corolla tube; stems 2-5 ft. high; leaves ovate — *M. sibírica*
   b. Calyx lobes lanceolate, acute, about ½-⅓ the length of the corolla tube; stems .5-2 ft.

high; stem leaves lance-ovate or spatulate to linear

(1) Leaves lance-ovate to oblong, thin and smooth; mostly in woodland *M. praténsis*

(2) Leaves lanceolate, or oblanceolate to linear, thickish, usually rough-hairy; mostly in open places *M. lanceoláta*

2. Filaments much shorter and narrower than the anthers; stems 2 to 12 in. high; at 10-14000 ft. *M. alpína*

MYOSÓTIS Linné 1753 FORGET-ME-NOT

(Gr. *mys*, mouse, *otis*, ear, from the hairy leaves)

Pl. 21, fig. 4.

Sepals 5, united, petals 5, blue, pink or white, united into a salver-form corolla, stamens 5, inserted on the corolla tube, included, ovary 4-divided, style thread-like, fruit of 4 nutlets attached by their bases; flowers in many-flowered elongated bractless more or less 1-sided racemes, or sometimes leafy at the base; leaves alternate, entire; annual, biennial or perennial.

Stems 4-10 in. high; leaves soft-hairy, linear-oblong to lanceolate *M. alpéstris*

ONOSMÓDIUM Michaux 1803 FALSE GROMWELL

(Of doubtful application)

Sepals 5, united, petals 5, yellowish or greenish white, united into a tube- or funnel-shaped corolla, the lobes erect, the tube with a glandular 10-lobed band within at the base, stamens 5, inserted on the throat of the corolla, included, ovary 4-parted, style thread-like, exserted, fruit of 4 nutlets (commonly only 1 or 2 ripening), ovoid, shining, smooth, white, attached by the bases; flowers in terminal leafy-bracted 1-sided spikes or racemes; leaves alternate, entire, strongly veined; perennial.

Plants pale to green, hairy or shaggy, 1-3 ft. high; leaves lance-ovate to oblong *O. caroliniánum*

SÝMPHYTUM Linné 1753 COMFREY

(Gr. *syn*, together, *phyo*, grow, from supposed healing properties)

Pl. 21, fig. 7.

Sepals 5, united, petals 5, yellow, blue or purple, united into a tubular corolla, slightly dilated above, the throat with 5 crests below the lobes,

stamens 5, inserted on the corolla-tube, included, ovary 4-divided, style thread-like, fruit of 4 nutlets, slightly incurved, wrinkled, inserted by their bases; flowers in-terminal simple or forked 1-sided racemes; leaves alternate, entire, those of the stem mostly clasping, the uppermost tending to be opposite, the lower long-petioled; perennial.

Stems 2-3 ft. high; leaves lanceolate to ovate, 3-8 in. long; flowers 1-2 cm. long *S. officinále*

SCROPHULARIALES SNAPDRAGON ORDER

SCROPHULARIACEAE SNAPDRAGON FAMILY

Sepals 4-5, united, petals 4-5, united into a 2-lipped or nearly regular corolla, stamens 2, 4 or 5, inserted on the corolla and alternate with its lobes, ovary with 2 cavities (or rarely 1), style slender, simple, stigma entire, 2-lobed or cleft, fruit usually a capsule; flowers mostly complete and irregular; herbs, shrubs or trees with opposite or alternate leaves.

1. Stamens 5, 1 usually without an anther
   - a. Stamens with anthers 5 — VERBASCUM
   - b. Stamens with anthers 4, the fifth a filament only
     - (1) Calyx deeply cleft; sterile filament conspicuous; flowers usually blue or purple, 2-4 cm. long — PENTSTEMON
     - (2) Calyx lobed; sterile filament short; flowers white, 1-1.5 cm. long — CHIONOPHILA
2. Stamens with anthers 4, the fifth sometimes an inconspicuous scale or gland
   - a. Sterile stamen a small scale or gland in the corolla tube
     - (1) Flowers greenish-yellow or purplish in long terminal clusters — SCROPHULARIA
     - (2) Flowers blue or blue and white, axillary — COLLINSIA
   - b. Sterile stamen wholly lacking
     - (1) Corolla regular; stemless mud or water plants — LIMOSELLA
     - (2) Corolla irregular, usually 2-lipped
       - (a) Corolla with a spur at base — LINARIA
       - (b) Corolla not spurred
         - x. Corolla hardly 2-lipped; stamens not beneath an upper lip — GERARDIA

PLATE 22

SNAPDRAGON ORDER

SNAPDRAGON FAMILY

1. Veronica americana: Speedwell
2. Orthocarpus luteus
3. Veronica buxbaumi: Speedwell
4. Mimulus langsdorfi: Monkey Flower
7. Castilleia miniata: Painted Cup
8. Collinsia parviflora
9. Pedicularis canadensis
10. Linaria vulgaris: Butter-and-eggs
11. Elephantella groenlandica: Little Elephant

BLADDERWORT FAMILY

5. Utricularia vulgaris: Bladderwort

BROOM-RAPE FAMILY

6. Thalesia uniflora

ROCKY MOUNTAIN FLOWERS

PLATE 22.

y. Corolla strongly 2-lipped; stamens beneath the upper lip
(x) Bracts and often the calyx conspicuous and bright-colored
m. Calyx 4-toothed; corolla lips somewhat equal — ORTHOCARPUS
n. Calyx deeply cleft before and behind; upper corolla lip much longer than lower — CASTILLEIA
(y) Bracts not conspicuous and bright-colored
m. Calyx divided to the base, hence of 1 or 2 parts — CORDYLANTHUS
n. Calyx usually toothed, sometimes 1-2-cleft also
(m) Leaves entire or toothed
r. Calyx 5-toothed, not inflated in fruit — MIMULUS
s. Calyx 4-toothed, inflated in fruit — RHINANTHUS
(n) Leaves pinnatifid; calyx not inflated
r. Upper lip a long and trunk-like beak — ELEPHANTELLA
s. Upper lip not long and trunk-like — PEDICULARIS

3. Stamens with anthers 2
a. Corolla 4-lobed, almost regular; flowers blue or bluish — VERONICA
b. Corolla 2-lipped or lacking
(1) Calyx 5-divided, the parts almost separate — GRATIOLA
(2) Calyx 4-parted — BESSEYA

BÉSSEYA Rydberg 1903 BESSEYA
(Named for the American botanist, Bessey)
(Synthyris Bentham)
Pl. 20, fig. 18.

Sepals 4, united, petals 4, purple, blue or pink, united into an oblong or bell-shaped corolla, more or less irregular, rarely wanting, stamens 2, inserted on the corolla, exserted, ovary with 2 cavities (rarely 3), style

thread-like, stigma globose, fruit a capsule, compressed, obtuse or notched at the summit; flowers in terminal spikes or racemes; leaves alternate, sessile or clasping, the stem-leaves small and bract-like, the basal ones large and stalked; perennial.

1. Corolla present
   a. Leaves cleft to pinnatifid — *B. pinnatífida*
   b. Leaves merely toothed
      (1) Flowers reflexed; calyx lobes 2 — *B. reflexa*
      (2) Flowers not reflexed; calyx lobes 3-4
         (a) Upper lip twice as long as calyx; corolla purple; stems 2-6 in. high; at 11-14000 ft. — *B. alpina*
         (b) Upper lip but little longer than calyx; corolla white to yellowish or purple; stems 6-15 in. high; at 5-12000 ft. — *B. plantaginea*
2. Corolla lacking — *B. rubra*

Castilléia Mutis 1781 Paintbrush

(Name for Castillejo, a Spanish botanist)

Pl. 22, fig. 7.

Sepals united into a 2-cleft tubular calyx, usually colored like the corolla, petals red, yellow, purple or white, united into a very irregular 2-lipped corolla, its upper lip (hood or galea) arched, elongated, concave or keeled, compressed, entire, enclosing the 4 stamens, lower lip short, 3-lobed, stamens attached to the tube of the corolla, ovary with 2 cavities, style thread-like, stigma entire or 2-lobed, capsule ovoid or oblong; flowers in dense terminal leafy-bracted spikes, the bracts often brightly colored and larger than the flowers; leaves alternate; annual or perennial.

1. Annuals; leaves and bracts lance-linear, entire; hood much longer than the lip — *C. minor*
2. Perennials; upper leaves and bracts usually broadened and toothed or parted
   a. Calyx cleft much more deeply in front than behind
      (1) Corolla hood or galea about as long as the tube, and 6-10 times longer than the obscure lip; leaves linear, the uppermost and bracts 3-parted, red, rarely pale — *C. linarifólia*
      (2) Galea ⅓-½ as long as the tube; bracts yellowish or whitish

(a) Galea twice as long as the distinct, 3-cleft lip
x. Corolla long exserted, about 2 in. long; leaves usually 3-5-cleft *C. sessiliflóra*
y. Corolla little exserted, about 1 in. long; leaves mostly entire *C. breviflóra*
(b) Galea 4-5 times as long as the obscure lip; bracts yellowish; leaves linear, entire or 3-cleft *C. fláva*
b. Calyx about equally cleft before and behind
(1) Stems with a close gray felt of hairs; bracts broad, entire or 3-toothed to deeply 3-cleft; corolla hood or galea usually shorter than tube *C. intégra*
(2) Stems smooth or hairy but not gray-felted; bracts variable
(a) Galea nearly equal to or longer than the corolla tube, 4-8 times as long as the lip; bracts red to whitish
x. Corolla 3-5 cm. long, much exserted *C. miniáta*
y. Corolla 2-3 cm. long, little exserted *C. parviflóra*
(b) Galea much shorter than the corolla tube, 2-3 times as long as the lip; bracts most variable, yellowish to purple or red
x. Plants 8-24 in. high; bracts mostly yellowish; at 7-10000 ft. *C. pállida*
y. Plant 1-8 in. high; bracts mostly brownish to purplish or red; at 11-14000 ft. *C. p. occidentális*

CHIONÓPHILA Bentham 1846 CHIONOPHILA
(Gr. *chion*, snow, *philos*, loving, from its habitat)
Pl. 20, fig. 17.

Sepals 5, united into a funnel-form calyx, petals 5, cream-colored, united into a tubular corolla with slightly dilated throat, 2-lipped, upper lip erect, barely 2-lobed, lower with convex densely bearded base forming a palate, 3-lobed, stamens 4 inserted on the corolla tube, ovary with 2 cavities; flowers in a dense spike; leaves entire, mostly in a basal tuft; high-alpine dwarf perennial.

Stems 1-6 in. high; flowers 10-15 cm. long *C. jámesi*

COLLÍNSIA Nuttall 1817 COLLINSIA
(Named for Collins, a botanist)
Pl. 22, fig. 8.

Sepals 5, united into a bell-shaped calyx, petals 5, blue, pink, white or variegated, united into a 2-lipped corolla with short tube, upper lip 2-cleft, lobes erect or curved backwards, lower lip larger, 3-lobed, the lateral lobes spreading or drooping, flat, the middle one folded, keel-like, enclosing the 4 stamens and thread-like style, stamens in pairs, united to the corolla tube, which bears a gland on the upper side near the base, ovary with 2 cavities, stigma small, head-like, or 2-lobed, capsule ovoid or globose, 2-valved, the valves 2-cleft; flowers in whorls or solitary in the axils; leaves opposite or whorled; winter-annual.

Stems spreading, 2-6 in. high; flowers 5-7 mm. long *C. parviflóra*

CORDYLÂNTHUS Nuttall 1846
(Gr. *kordyle,* club, *anthos,* flower)

Sepals united into a spathe, green, as are also the bracts, petals 5, dull yellow or purplish, united into a tubular, 2-lipped corolla, stamens 4, ovary with 2 cavities, style hooked at tip; flowers in small terminal clusters or sometimes scattered; leaves alternate, narrow, entire or parted; annual.

1. Calyx of 2 parts
   a. Corolla yellow or yellowish, 10-12 mm. long *C. ramósus*
   b. Corolla purplish, 20-25 mm. long *C. wrighti*
2. Calyx of 1 part; corolla purplish, 2 cm. long *C. kingi*

ELEPHANTÉLLA Rydberg 1900 LITTLE ELEPHANT
(Gr. *elephas,* elephant, from the shape of the upper lip)
Pl. 22, fig. 11.

Sepals 5, united into a tubular calyx, petals 5, purplish, united into a 2-lipped corolla, upper lip hooded with a curved beak, lower lip 3-lobed, lobes spreading, the middle one smallest, stamens 4 in pairs, within the hood of the corolla, ovary with 2 cavities, capsule compressed, oblique or curved, beaked; flowers in terminal spikes; leaves pinnately cut; perennial.

Stems 4 in.-2 ft. high; leaves lanceolate, 2-6 in. long, often red-brown *E. groenlándica*

GERARDIA Linné 1753 GERARDIA
(Named for the English herbalist, Gerard)

Sepals 5, united into a bell-shaped calyx, petals 5, purple, violet,

yellow, red or rarely white, united into a slightly irregular, bell- or funnel-shaped corolla, slightly 2-lipped, stamens 4 in pairs, inserted on the corolla, included, ovary with 2 cavities, style thread-like, capsule globose or ovoid; flowers in racemes or panicles, or solitary and axillary; leaves mainly opposite and sessile; annual or perennial.

Stems erect, 1-2 ft. high; leaves linear, 1-2 in. long; corolla 10-15 cm. long — *G. besseyána*

GRATÍOLA Linné 1753 HEDGE HYSSOP
(Lat. *gratia,* favor, *-ola,* small, from its reputed healing qualities)

Sepals 5, united, into a slightly unequal calyx, petals 5, yellow or whitish, united into an irregular somewhat 2-lipped corolla, its tube cylindric, upper lip entire or 2-cleft, lower lip 3- lobed, stamens 2 perfect, 2 sterile (or these lacking), ovary with 2 cavities, style thread-like, stigma slightly 2-lobed, capsule ovoid or globose, 4-valved; flowers stalked, solitary in the axils; leaves opposite, entire or toothed; annual or perennial.

Stems 4-12 in. high; leaves oblong, 1-2 in. long; corolla 8-12 mm. long — *G. virginiána*

LIMOSÉLLA Linné 1753 MUDWEED
(Lat. *limus,* mud, *sella,* seat, from its habitat)

Sepals 5, united into a bell-shaped calyx, petals 5, white, pink or purple, united into an open bell-shaped nearly regular corolla with short tube, stamens 4, inserted on the corolla tube, scarcely exserted, ovary with 2 cavities at the base, 1 above, style short, stigma head-shaped, capsule globose or oblong, becoming 1-celled; flowers solitary at the ends of leafless stems arising from the ground; leaves basal, entire; floating or creeping tufted annuals.

Plants 1-4 in. high; leaves spatulate, 1-5 in. long; flowers 2-3 mm. wide — *L. aquática*

LINÁRIA Jussieu 1789 BUTTER-AND-EGGS, TOAD-FLAX
(Lat. *linaria,* flax-like, from the resemblance)
Pl. 22, fig. 10.

Sepals 5, united, petals 5, yellow, white, blue, purple or variegated, united into an irregular, 2-lipped corolla, spurred at the base, the upper lip erect, 2-lobed, the lower spreading 3-lobed, its base produced into a palate often nearly closing the throat, stamens 4 in pairs, ascending, inserted on the corolla, included, ovary with 2 cavities, style thread-like, capsule ovoid or globose, opening by 1 or more mostly 3-toothed pores or slits below

the summit; flowers in terminal racemes or spikes; leaves alternate, entire, dentate or lobed, or the lower opposite or whorled; annual, biennial or perennial.

1. Flowers yellow and orange, 2-3 cm. long — *L. vulgáris*
2. Flowers blue and white, 8-12 mm. long — *L. canadénsis*

Mímulus Linné 1753 Monkey Flower

(Gr. *mimos*, comic actor, from the grinning corolla)

Pl. 22, fig. 4.

Sepals 5, united into a 5-angled, 5-toothed calyx, the upper tooth usually the largest, petals 5, pink, violet or yellow, united into an irregular 2-lipped corolla, tube cylindric, upper lip erect or turned backwards, lower lip spreading, 3-lobed, the lobes rounded, stamens 4 in pairs, inserted on the corolla tube, ovary with 2 cavities, style thread-like, stigma 2-lobed, capsule oblong or linear, enclosed by the calyx; flowers axillary, solitary, stalked; leaves opposite mostly toothed; perennial.

1. Flowers yellow
   a. Upper calyx tooth largest; fruiting calyx inflated
      (1) Stems spreading, rooting at the joints — *M. géyeri*
      (2) Stems erect, not rooting at the joints
         (a) Corolla 2-3 cm. long; perennial — *M. langsdórfi*
         (b) Corolla 6-10 mm. long; annual — *M. hálli*
   b. Calyx teeth equal or nearly so; fruiting calyx not inflated; leaves sticky, musk-scented
      (1) Corolla 2-4 cm. long; perennial — *M. moschátus*
      (2) Corolla 10-12 mm. long; annual — *M. floribúndus*
2. Flowers red to purple
   a. Corolla 1.5-5 cm. long
      (1) Corolla 1.5-2 cm. long; stigma funnel-form — *M. nánus*
      (2) Corolla 3-5 cm. long; stigma 2-lobed — *M. lewísi*
   b. Corolla 6-8 mm. long; stigma 2-lobed — *M. rubéllus*

Orthocárpus Nuttall 1818 Orthocarpus

(Gr. *orthos*, straight, *karpos*, fruit)

Pl. 22, fig. 2.

Sepals united into a tubular or bell-shaped calyx, 4-cleft or sometimes split down both sides, petals 5, yellow, white or purplish, united into a very irregular, 2-lipped corolla with slender tube, upper lip little if any longer than the 3-lobed 1-3-pouched lower one, stamens 4 in pairs, inserted in the

corolla and ascending under the upper lip, ovary with 2 cavities, style thread-like, stigma entire, capsule oblong; flowers in bracted usually dense spikes, the bracts sometimes brightly colored; leaves mostly alternate; annual, rarely perennial.

1. Flowers yellow — *O. lúteus*
2. Flowers white to rose-purple — *O. purpureo-álbus*

Pedicularis Linné 1753 Pedicularis

(Lat. *pedicula*, louse)

Pl. 22, fig. 9.

Sepals 5, united into a tubular calyx, cleft on the lower side or sometimes also on the upper, or 2-5-toothed, petals 5, yellow, red, purple or white, united into a strongly 2-lipped corolla, the tube cylindric, the upper lip (galea) compressed, concave or folded, sometimes beaked, the lower lip erect or ascending, 3-lobed, the lobes spreading or turned backwards, the middle one the smallest, stamens 4 in pairs, inserted on the corolla and ascending within the upper lip, ovary with 2 cavities, capsule compressed, oblique or curved, beaked; flowers in terminal spikes or spike-like racemes; leaves alternate opposite or rarely whorled, usually pinnately cut or lobed; annual, biennial or perennial.

1. Leaves pinnatifid or apparently pinnate
   - a. Flowers yellowish, or yellow, rarely reddish
     - (1) Upper lip or galea with a distinct curved beak; alpine plants — *P. párryi*
     - (2) Galea without a distinct beak
       - (a) Leaves divided to the midrib, appearing pinnate; calyx 5-lobed
         - x. Galea with 2 lateral teeth; flowers greenish; stems 2-6 ft. high — *P. procéra*
         - y. Galea without lateral teeth; flowers yellow; stems .5-1.5 ft. high — *P. bracteósa*
       - (b) Leaves with rounded lobes about halfway to the midrib; calyx cleft on the lower side; stems low and spreading — *P. canadénsis*
   - b. Flowers purple or purplish
     - (1) Galea with a long curved beak; calyx cleft below — *P. ctenóphora*
     - (2) Beak none, or short and straight
       - (a) Calyx teeth much shorter than tube; corolla 8-20 mm. long — *P. scopulórum*

(b) Calyx teeth and tube about equal; corolla 20-25 mm. long *P. cystoptérides*

2. Leaves merely round-toothed
   a. Flowers white; beak of galea long and coiled *P. racemósa*
   b. Flowers purple, rarely whitish; beak none *P. crenuláta*

PENTSTÉMON Solander 1789 PENTSTEMON, BEARD-TONGUE
(Gr. *pente,* five, *stemon,* stamen, from the sterile stamen)
Pl. 23, fig. 1-6.

Sepals 5, united, petals 5, blue, purple, red or white, united into an irregular 2-lipped corolla, tube elongated, more or less enlarged above, upper lip 2-lobed, lower lip 3-lobed, stamens 5 inserted on the corolla, included, 4 of them fertile and in pairs, the fifth sterile, ovary with 2 cavities, style thread-like, stigma globose, capsule ovoid, oblong or globose; flowers in terminal racemes or panicles; leaves opposite or rarely whorled, or the upper occasionally alternate; perennial.

1. Corolla red
   a. Corolla strongly 2-lipped
      (1) Pedicel and calyx sticky-hairy; anther cells split to middle only; leaves oblanceolate *P. bridgesi*
      (2) Pedicel and calyx smooth; anther cells split to base; leaves lance-linear *P. barbátus*
   b. Corolla slightly 2-lipped, the lobes nearly equal; leaves lance-ovate *P. eátoni*
2. Corolla blue, purple, rose or white
   a. Stems shrubby and woody at base
      (1) Corolla 2-4 cm. long; leaves obovate to oblanceolate, usually toothed *P. fruticósus*
      (2) Corolla 1-2 cm. long
         (a) Leaves lanceolate to lance-ovate, sharply toothed *P. deústus*
         (b) Leaves linear to spatulate, entire
            x. Leaves obovate to oblanceolate *P. caespitósus*
            y. Leaves linear
               (x) Flowers alternate, single on very short stalks *P. linarioídes*
               (y) Flowers opposite, in twos on long stalks *P. ambíguus*
   b. Stems herbaceous, often hard but not shrubby and twig-like at base

(1) Leaves linear thread-like, densely tufted at base; flowers purple or white — *P. laricifólius*
(2) Leaves lance-linear to ovate or rounded
(a) Stems single or few, erect, 6-24 in. high
x. Corolla narrow, 1-2 cm. long
(x) Flowers verticillate in 1 to several head-like clusters, making an interrupted spike, yellowish to blue; sepals usually white-margined and toothed — *P. confértus*
(y) Flowers not in a head-like cluster; sepals mostly entire and not white-margined; blue — *P. grácilis*
y. Corolla widened into a throat, 2-4 cm. long — *P. hárbouri*
(b) Stems many, clustered, spreading, mostly 2-6 ft. high, from a spreading rootstock
x. Anthers long-hairy
(x) Corolla swollen above, 2.5-4 cm. long; stems glaucous — *P. stríctus*
(y) Corolla scarcely enlarged, 1.5-2 cm. long; stems finely hairy — *P. frémónti*
y. Anthers smooth or sparsely short-hairy
(x) Sterile stamen smooth; corolla 2.5-4 cm. long — *P. gláber*
(y) Sterile stamen bearded
m. Stems sticky-hairy above, at least the pedicels and calyx
(m) Stems smooth; pedicel and calyx sticky-hairy; flowers wine-colored to nearly black, sometimes pale — *P. glaúcus*
(n) Stems hairy or glandular
r. Sterile filament densly bearded; corolla rose to purple, 2-3 cm. long — *P. cristátus*
s. Sterile filament sparsely short-bearded; corolla white 1.5-2 cm. long — *P. álbidus*
n. Stems not sticky-hairy
(m) Upper leaves and flower

PLATE 23

PENTSTEMONS: BEARD-TONGUES

1. Pentstemon secundiflorus
2. Pentstemon glaucus
3. Pentstemon gracilis
4. Pentstemon barbatus
5. Pentstemon confertus
6. Pentstemon unilateralis

ROCKY MOUNTAIN FLOWERS

PLATE 23.

bracts clasping, rounded or broadly ovate, the base heart-shaped

r. Stems 2-6 ft. high, glaucous; leaves oval to round; flowers 4-5 cm. long — *P. grandiflórus*

s. Stems 1-2 ft.; leaves linear to lance-ovate; flowers 1.5-3 cm. long

(r) Flower cluster short, dense, the ovoid bracts nearly concealing the blue flowers beneath; a plains species — *P. háydeni*

(s) Flower cluster often 6-10 in. long, interrupted, the bracts round, pointed, small; flowers rose-purple; at 7-9000 ft. — *P. cyathóphorus*

(n) Upper leaves and flower bracts not clasping and cordate, lance-ovate to linear

r. Corolla 1.5-2 cm. long; stems 1-10 in. high, usually tufted; leaves lance-linear to long-linear

(r) Flowers purple, sterile stamen densely bearded; at 10-13000 ft. — *P. hálli*

(s) Flowers deep blue, sterile stamen short-bearded; at 3-6000 ft. — *P. angustifólius*

s. Corolla 2-4 cm. long; stems mostly 1-5 ft. high

(r) Leaves narrow, lanceolate or oblanceolate to linear; stems strict, tall, 2-5 ft. high — *P. unilaterális*

(s) Leaves broader, lance-ovate to ovate or oblong; stems usually clustered,

ascending or spreading, 1-2 ft. high

h. Flowers rose-purple, or pink; sepals entire; leaves ovate, pointed, glaucous *P. secundiflórus*

i. Flowers blue; sepals toothed; leaves lance-ovate to oblong, usually green *P. gláber*

Rhinánthus Linné 1753 Rattle-box

(Gr. *rhinos*, nose, *anthos*, flower, from the beaked form)

Sepals 4, united into a compressed calyx, much inflated, papery and veiny in fruit, petals 5, yellow, blue, violet or variegated, united into a 2-lipped corolla, the upper-lip (galea) compressed, arched, minutely 2-toothed below the entire apex, the lower lip 3-lobed and spreading, stamens 4 in pairs, inserted on the corolla, ovary with 2 cavities, capsule round in outline, flat; flowers in terminal 1-sided, leafy-bracted spikes or solitary in the upper axils; leaves opposite; annual.

Stems .5-2 ft. high; leaves lance-oblong, 1-2 in. long; flowers 10-15 mm. long *R. crus-gálli*

Scrophulária Linné 1753 Figwort

(Named for its reputed value in scrofula)

Sepals 5, united, petals 5, purple, greenish or yellow, united into an irregular corolla, tube globose to oblong, the 2 upper lobes longer, erect, the lateral ones ascending, the lower spreading or turned backwards, stamens 5, inserted on the corolla, 4 of them fertile and in pairs, mostly included, the fifth sterile, reduced to a scale on the roof of the corolla tube, ovary 2-celled, style thread-like, stigma head-like or straight, capsule ovoid; flowers in terminal open or close clusters; leaves mostly opposite, large; perennial

Stems 2-6 ft. high; leaves 2-6 in. long; flowers 6-8 mm. long *S. nodósa*

Verbáscum Linné 1753 Mullein

(The Latin name)

Sepals 5, united, petals 5, yellow, purple, red or white, united into a flat or slightly saucer-shaped corolla, the lobes a little unequal, stamens 5, inserted on the base of the corolla, filaments of the 3 upper or of all 5 hairy,

ovary with 2 cavities, style flattened at the summit, capsule globose to oblong, 2-valved, the valves usually 2-cleft at the apex; flowers in terminal spikes, racemes or panicles; leaves alternate, toothed, pinnately cut or entire; biennial or rarely perennial.

1. Plants densely woolly; flowers in long dense spikes — *V. thápsus*
2. Plants smooth or sparsely hairy; flowers in racemes — *V. blattária*

VERÓNICA Linné 1753 VERONICA
(Named for St. Veronica)
Pl. 22, fig. 1, 3.

Sepals mostly 4, sometimes 5, united, petals 4 (rarely 5), blue, purple, pink or white, united into a saucer-shaped corolla, with very short tube and unequal lobes, the lower lobe commonly the narrowest, stamens 2, spreading, inserted on either side of the upper corolla lobe, ovary with 2 cavities, style slender, stigma globose, capsule compressed, sometimes very flat, notched, heart-shaped or 2-lobed; flowers terminal or axillary, solitary or in racemes or spikes; leaves opposite and alternate, rarely whorled; annual or perennial.

1. Flowers in terminal clusters
   a. Capsule oblong, notched; leaves sessile — *V. alpína*
   b. Capsule nearly round, broadly heart-shaped above; lower leaves petioled — *V. serpyllifólia*
2. Flowers solitary or clustered in the axils of the leaves
   a. Flowers solitary
      (1) Flowers white or whitish; leaves linear to oblong — *V. peregrína*
      (2) Flowers blue; leaves ovoid — *V. buxbáumi*
   b. Flowers in racemes
      (1) Leaves ovate to lance-ovate
         (a) Stem leaves petioled — *V. americána*
         (b) Stem leaves sessile and often clasping — *V. anagállis*
      (2) Leaves linear to lance-linear — *V. scutelláta*

PINGUICULACEAE BLADDERWORT FAMILY

Sepals 2-5, united, petals 5, united into a 2-lipped corolla, the upper lip usually erect, concave or the sides plaited, entire or 2-lobed, lower lip larger, spreading or turned back, 3-lobed with nectar-bearing spur beneath, stamens 2, on the corolla, ovary with 1 cavity, ovoid or globose, style short

or none, stigma 2-lobed, fruit a capsule; flowers solitary or in racemes on naked stems, flower stalks with small bracts; leaves basal and tufted, or borne on floating branching stems, or reduced to minute scales; aquatic or on moist ground.

UTRICULÁRIA Linné 1753 BLADDERWORT
(Lat. *utriculus,* bladder, from the leaf bladders)
Pl. 22, fig. 5.

Sepals 2, united, petals 5, purple or yellow, united into a 2-lipped corolla, upper lip erect and entire, lower lip larger, 3-lobed, spurred at the base, stamens 2 on the corolla, ovary 1-celled, fruit a capsule; flowers in racemes or solitary at the summits of slender leafless stems, the flower-stalks with 2 little bracts; leaves finely divided; herbs floating in the water or rooting in the mud, the floating species with stems bearing finely divided leaves and covered with minute bladders.

1. Corolla 12-15 mm. wide; leaf-bladders 4-5 mm. *U. vulgáris*
2. Corolla 4-6 mm. wide; leaf-bladders 1-2 mm. *U. mínor*

OROBANCHÁCEAE BROOM-RAPE FAMILY

Sepals 4-5, united, petals 5, united into a more or less 2-lipped corolla, the tube cylindric or expanded above, stamens 4 in pairs, on the tube of the corolla and alternate with its lobes, a fifth rudimentary one occasionally present, ovary 1-celled, style slender, stigma disk-like, 2-lobed or sometimes 4-lobed, capsule 1-celled, 2-valved; flowers in terminal spikes, or solitary in the axils of the scales; erect brown, yellowish, purplish or nearly white root-parasites with leaves reduced to alternate appressed scales.

1. Flower-stalk or calyx with 1 or more bracts; flowers nearly sessile in spikes — OROBANCHE
2. Flower-stalk and calyx without bracts; flowers solitary on long stalks — THALESIA

OROBÁNCHE Linné 1753 BROOM-RAPE
(Gr. *orobos,* vetch, *anchone,* strangler, from its parasitic habit)

Sepals 2-5, united into a calyx split both above and below nearly or quite to the base, the division 2-cleft or rarely entire, or 2-5-toothed, petals 5, reddish, yellowish, violet or nearly white, united into a 2-lipped corolla, upper lip erect, notched or 2-lobed, lower lip spreading, 3-lobed, stamens 4 in pairs on the tube of the corolla, included, ovary with 1 cavity, style slender, commonly persistent until after the splitting of the capsule, stigma shield- or funnel-shaped, entire or 2-lobed; flowers in spikes or racemes; leaves reduced to scattered scales the color of the flowers; root parasites.

1. Corolla 1.5-2 cm. long; anthers smooth — *O. ludoviciána*
2. Corolla 2-2.5 cm. long; anthers woolly — *O. multiflóra*

Thalésia Rafinesque 1818 Broom-rape
(Named for the Greek philosopher, Thales)
(Aphyllon Gray)
Plate 22, fig. 6.

Sepals 5, united into a bell-shaped calyx, petals 5, yellowish, white or violet, united into a 2-lipped corolla, the tube elongated, curved, upper lip erect-spreading, 2-lobed, the lower spreading, 3-lobed, lobes all nearly equal, stamens 4 in pairs on the tube of the corolla, included, ovary with 1 cavity, ovoid, style slender, deciduous, stigma shield-shaped or transversely 2-lobed; flowers on long bractless stalks; leaves reduced to scattered scales the color of the flowers; root-parasites.

1. Stem nearly absent; flowers 1-4; calyx-lobes lanceolate — *T. uniflóra*
2. Stem 2-5 in. high; flowers 3-15; calyx-lobes triangular — *T. fasciculáta*

MARTYNIÁCEAE MARTYNIA FAMILY

Sepals 4-5, united into a 4-5-cleft calyx, petals 5, united into a 2-lipped corolla, lobes nearly equal, the 2 upper ones exterior in the bud, stamens 4 in pairs on the tube of the corolla, fertile or the posterior pair sterile, ovary with 1 cavity, with 2 broad ovule-bearing surfaces, or with 2-4 cavities by false partitions, style slender, stigma 2-lobed, fruit various in the different genera; flowers in racemes; herbs with opposite leaves, or the upper sometimes alternate.

Martýnia Linné 1753 Unicorn Plant
(Named for the English botanist, Martyn)

Sepals 5, united into a bell-shaped, inflated calyx, petals 5, violet, purple, whitish or mottled, united into a funnel- or bell-shaped corolla, the lobes nearly equal, spreading, stamens 4 on the tube of the corolla, ovary with 1 cavity, the ovules in 1 or 2 rows on 2 broad places of attachment in the center of the cavity, fruit an incurved, beaked 2-valved capsule, somewhat fleshy without, fibrous and woody within, ridged below or also above, 4-celled; flowers in short terminal racemes; leaves opposite or alternate, long-stalked; strong-scented annual.

Stems creeping, 1-5 ft. long; leaves 4-12 in. wide; flowers 4-5 cm. long — *M. louisiána*

MENTHALES MINT ORDER

VERBENACEAE VERBENA FAMILY

Sepals 4-5, united, petals 4-5, united into a regular or 2-lipped corolla, the tube usually cylindric, stamens 4 in pairs on the tube of the corolla, rarely only 2 or as many as the corolla lobes and alternate with them, ovary with 2-4 cavities (rarely 8-10) with 1-2 ovules in each cavity, style terminal, simple, stigmas 1 or 2, fruit dry, separating at maturity into 2-4 nutlets; flowers in terminal or axillary clusters; herbs or shrubs with opposite, whorled or rarely alternate leaves.

1. Corolla 4-lobed; nutlets 2 — LIPPIA
2. Corolla 5-lobed; nutlets 4 — VERBENA

LÍPPIA Linné 1753 LIPPIA

(Named for Lippi, a French naturalist)

Sepals 2-4, united into a small calyx, petals 4, pale blue, purple or white, united into a 2-lipped corolla, tube cylindric, lobes broad, spreading, often notched, stamens 4 in pairs, on the tube of the corolla, ovary with 2 cavities, 1 ovule in each, style short, stigma oblique or curved backward, fruit dry, separating into two nutlets; flowers in axillary or terminal spikes or heads; leaves opposite, sometimes whorled or rarely alternate; perennial.

1. Leaves linear-wedge-shaped, 2-8-toothed above — *L. cuneifólia*
2. Leaves lanceolate to oblong, many-toothed — *L. lanceoláta*

VERBÉNA Linné 1753 VERBENA, VERVAIN

(Lat. *verbena*, a sacred branch)

Pl. 24, fig. 7.

Sepals 5, united into a tubular, 5-angled, more or less unequally 5-toothed calyx, petals 5, variously colored, united into a salver- or funnel-form corolla, 2-lipped or regular, stamens 4 in pairs on the corolla-tube, (rarely 2) included, ovary 4-celled, 1 ovule in each cavity, style usually short, 2-lobed at the summit, one of the lobes stigmatic, fruit dry, mostly enclosed by the calyx, at length separating into 4 nutlets; flowers in terminal solitary or clustered spikes; leaves mostly opposite; annual or perennial.

1. Flowers 8-25 mm. long, 4-20 mm. wide, in flat-topped clusters
   a. Corolla 4-8 mm. wide; leaves .5-1 in. long — *V. ciliáta*
   b. Corolla 8-20 mm. wide; leaves 1-4 in. long
      (1) Corolla 8-10 mm. wide; leaves twice pinnatifid — *V. bipinnatifida*

(2) Corolla 12-20 mm. wide; leaves once pinnatifid — *V. canadénsis*

2. Flowers 4-10 mm. long, 2-8 mm. wide, in spikes
   a. Bracts of spike longer than the flowers; stems spreading — *V. bracteósa*
   b. Bracts of spike small and inconspicuous; stems erect
      (1) Corolla 3-4 mm. wide; plants smooth or sparsely hairy — *V. hastáta*
      (2) Corolla 6-8 mm. wide; plants densely soft-hairy — *V. stricta*

MENTHACEAE MINT FAMILY

Sepals 5 (rarely 4), united into a regular or 2-lipped calyx, petals 4-5, united into a mostly 2-lipped but sometimes regular corolla, upper lip 2-lobed or entire, lower lip 3-lobed, stamens 4 in pairs on the corolla-tube, sometimes 2, ovary 4-lobed or parted, each lobe or division with 1 ovule, style 2-cleft at the summit, fruit of 4 1-seeded nutlets; flowers variously clustered; aromatic herbs or shrubs, mostly with 4-sided stems and simple opposite leaves without stipules.

1. Stamens 2
   a. Corolla nearly regular, 4-5 lobed, white; leaves sharply toothed or cut — LYCOPUS
   b. Corolla 2-lipped, mostly blue to rose or purple
      (1) Flowers blue, in terminal racemes or spikes; calyx 2-lipped or 3-lobed — SALVIA
      (2) Flowers rose to purple, rarely white, in head-like or axillary clusters
         (a) Flowers 2-4 cm. long, in dense mostly terminal heads — MONARDA
         (b) Flowers 5-12 mm. long, axillary, solitary or few in a cluster — HEDEOMA
2. Stamens 4
   a. Calyx 2-lipped
      (1) Calyx cap-shaped, lips entire — SCUTELLARIA
      (2) Calyx lips toothed
         (a) Flower bracts large, round, purplish — PRUNELLA
         (b) Flower bracts neither round nor purple
            x. Corolla apparently with one long lip — TEUCRIUM
            y. Corolla clearly 2-lipped — CLINOPODIUM

b. Calyx more or less equally 4-5-toothed, rarely 10-toothed
(1) Corolla regular or nearly so, 4-cleft — MENTHA
(2) Corolla 2-lipped
(a) Calyx 10-toothed; leaves white-woolly — MARRUBIUM
(b) Calyx 4-5-toothed
x. Upper tooth much larger than the other 4; flowers light blue in a dense terminal spike — DRACOCEPHALUM
y. Teeth equal in size or nearly so
(x) Calyx swollen in fruit; flowers purple, 10-12 mm. long — PHYSOSTEGIA
(y) Calyx not swollen in fruit
m. Calyx teeth rigid, spiny; corolla hairy — LEONURUS
n. Calyx teeth not rigid and spiny
(m) Flowers in heads — MONARDELLA
(n) Flowers not in heads
r. Lower or outer stamens shorter than the inner
(r) Anther halves parallel and touching — AGASTACHE
(s) Anther halves spreading — NEPETA
s. Lower or outer stamens longer than the inner — STACHYS

AGÁSTACHE Clayton 1762 GIANT HYSSOP
(Gr. *agan,* much, many, *stachys,* spike)

Sepals 5, united into a narrow bell-shaped, somewhat oblique, slightly 2-lipped calyx, petals 5, yellowish, purplish or blue, united into a strongly 2-lipped corolla, upper lip erect, 2-lobed, lower lip spreading, 3-lobed, stamens 4 in pairs on the corolla-tube, the upper or inner pair longer, ovary deeply 4-parted, style 2-cleft, nutlets ovoid, smooth; flowers in dense terminal spikes; leaves toothed, mainly ovate, stalked; perennial.

1. Flowers blue; calyx-teeth acute; leaves gray beneath — *A. anethiodóra*
2. Flowers pale violet or purplish; calyx-teeth long-pointed; leaves green beneath — *A. urticifólia*

CLINOPÓDIUM Linné 1753 WILD BASIL
(Gr. *klinos,* bed, *podion,* little foot)

Sepals 5, united into a 2-lipped, tubular or oblong calyx, upper lip

3-toothed, lower 2-cleft, petals 5, purple, pink or white, united into a 2-lipped corolla, upper lip erect, entire or notched, lower spreading, 3-cleft, stamens 4 in pairs on the corolla-tube, ovary deeply 4-parted, style 2-cleft, nutlets ovoid, smooth; flowers variously clustered; leaves entire or sparingly toothed; annual or perennial.

Flowers purple, pink or white, 5-7 mm. wide; leaves ovate — *C. vulgáre*

DRACOCÉPHALUM Linné 1753 DRAGON HEAD
(Gr. *drakon,* dragon, *kephale,* head, from the corolla)

Sepals 5, united into a tubular calyx, with the upper tooth much larger than the others, or 2-lipped, the upper 3 teeth more or less united, petals 5, blue or purple, united into a 2-lipped corolla, upper lip erect, notched, lower lip spreading, 3-lobed, stamens 4 in pairs on the corolla-tube, the upper or inner pair longer, ovary deeply 4-parted, style 2-cleft, nutlets smooth, ovoid; flowers in axillary or terminal bracted clusters; leaves toothed, entire or cut; perennial.

Flowers pale blue, 5-7 mm. wide; leaves lanceolate to oblong, sharply toothed — *D. parviflórum*

HEDEÓMA Persoon 1807 PENNROYAL
(Corrupted from Gr. *hedysma,* sweetness)
Pl. 24, fig. 8.

Sepals 5, united into a tubular calyx, hairy in the throat, 2-lipped or nearly equally 5-toothed, petals 5, blue or purple, united into a 2-lipped corolla, the upper lip erect, entire, notched or 2-lobed, the lower spreading 3-cleft, perfect stamens 2, sterile stamens 2, minute or none, ovary deeply 4-parted, style 2-cleft, nutlets ovoid, smooth; flowers in axillary clusters crowded into terminal spikes or racemes; leaves entire or scalloped; annual or perennial, strongly aromatic and pungent.

1. Soft gray-hairy perennial; flowers 8-12 mm. long; 2 lower calyx-teeth nearly twice as long as upper — *H. drummóndi*
2. Rough-hairy annual; flowers 5-6 mm. long; calyx-teeth about equal — *H. híspida*

LEONÚRUS Linné 1753 MOTHERWORT
(Gr. *leon,* lion, *oura,* tail)

Sepals 5, united into a tube- or bell-shaped calyx with 5 rigid, awl-shaped or bristle-like teeth, petals 5, white or pink, united into a 2-lipped

PLATE 24

MINTS—VERBENAS

MINT FAMILY

1. Scutellaria resinosa: Skull-cap
2. Prunella vulgaris: Heal-all
3. Mentha canadensis: Brook-mint
4. Monarda fistulosa: Horse-mint
5. Salvia pitcheri: Blue Sage
6. Stachys palustris: Woundwort
8. Hedeoma drummondi

VERBENA FAMILY

7. Verbena bracteosa

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corolla, the upper lip erect, concave or nearly flat, entire, the lower lip spreading or turned abruptly downward, 3-lobed, stamens 4 in pairs, the lower or outer pair the longer, ovary deeply 4-parted, style 2-cleft, nutlets 3-sided, smooth; flowers whorled in dense axillary clusters; leaves palmately cleft, parted or toothed; biennial or perennial.

Flowers pink to white, 6-10 mm. long; leaves 3-5-cleft *L. cardíaca*

Lýcopus Linné 1753 Water Hoarhound
(Gr. *lykos,* wolf, *pous,* foot)

Sepals 4-5, united into a bell-shaped calyx, petals 4, white or purple, united into a funnel-form or bell-shaped to cylindric corolla, perfect stamens 2, ovary deeply 4-parted, style slender, 2-cleft, nutlets narrowed below; flowers whorled in dense axillary clusters; leaves toothed or deeply cut; perennial.

1. Leaves pinnatifid or deeply cut *L. americánus*
2. Leaves merely sharply and coarsely toothed *L. lúcidus*

Méntha Linné 1753 Mint
(Gr. *mintha,* Lat. *mentha,* mint)
Pl. 24, fig. 3.

Sepals 5, united into a bell-shaped to tubular, 10-nerved calyx, regular or slightly 2-lipped, petals apparently 4, purple, pink or white, united into a somewhat irregular corolla, stamens 4, ovary 4-parted, style 2-cleft, nutlets ovoid, smooth; flowers in axillary whorls or terminal dense or interrupted spikes; leaves simple, toothed; perennials.

1. Flowers in axillary clusters; leaves petioled *M. canadénsis*
2. Flowers in terminal spikes; leaves nearly sessile *M. spicáta*

Marrúbium Linné 1753 Hoarhound
(Lat. name from the Hebrew for bitter)

Sepals united into a 5-10-nerved, 5-10-toothed calyx, the teeth spreading or recurved in fruit, petals 5, white or purplish, united into a 2-lipped corolla, the upper lip erect, the lower spreading, 3-cleft, stamens 4 in pairs, included, style 2-cleft, ovary deeply 4-lobed, nutlets ovoid. smooth; flowers in dense axillary clusters; leaves petioled, toothed, wrinkled; perennial.

Leaves ovate-rounded, crenate; flowers small, white *M. vulgáre*

Monárda Linné 1753 Bee Balm, Horse-mint
(Named for Monardez, a Spanish writer on medical plants)
Pl. 24, fig. 4.

Sepals 5, united into a 5-toothed tube, the throat usually hairy, petals

5, pink to lilac, rarely white, united into a deeply 2-lipped corolla, upper lip long and narrow, lower lip flat, 3-lobed, stamens with anthers 2, ovary deeply 4-parted, styles 2-cleft, fruit of 4 nutlets; flowers in dense heads or clusters, terminal or sometimes axillary also; leaves opposite, toothed; annual or perennial.

1. Heads usually single and terminal; corolla pink to rose-purple, 2.5-4 cm. long; hairy to glabrous *M. fistulósa*
2. Heads several, axillary and terminal; corolla white to pinkish, 1-2.5 cm. long *M. citriodóra*

Monardélla Bentham 1834
(Named from its resemblance to Monarda)

Sepals 5, united into a 5-toothed tube, petals 5, purple or white, united into a 2-lipped corolla, upper lip cleft, the lower 3-cleft, stamens 4, the lower or outer pair longer, ovary 4-lobed, style 2-cleft; flowers in terminal heads with broad bracts; leaves opposite, entire; perennial.

Leaves lance-ovate to lance-oblong, entire, 6-12 mm. long; corolla rose-purple *M. parviflóra*

Népeta Linné 1753 Catnip, Ground Ivy
(Lat. name of the catnip)

Sepals 5, united into a 5-toothed tube, petals 5, white to purplish, united into a 2-lipped corolla, upper lip erect, entire or lobed, lower lip spreading, 3-lobed, stamens 4, lower or outer pair shorter, ovary 4-lobed, style 2-cleft; flowers in whorled clusters, usually forming terminal spikes; leaves opposite, toothed or somewhat cut; perennial.

1. Stems erect, leaves ovate to oblong; flowers whitish, terminal, 10-12 mm. long *N. cataria*
2. Stems creeping; leaves round; flowers axillary, blue, 1.5-2.5 cm. long *N. hederácea*

Physostégia Bentham 1834 Dragon Head
(Gr. *physa*, bladder, *stege*, roof, from the enlarged calyx)

Sepals 5, united into a 5-toothed calyx, becoming swollen in fruit, petals 5, rose to purple, united into a 2-lipped corolla, upper lip concave, entire, lower lip spreading, 3-lobed, stamens 4, the lower or outer pair longer; ovary 4-lobed, style 2-cleft; flowers in terminal spikes; leaves opposite, toothed or entire; perennial.

Leaves lanceolate to lance-ovate, toothed; flowers purple, 10-12 mm. long *P. parviflóra*

PRUNÉLLA Linné 1753 SELF-HEAL, HEAL-ALL
(Of uncertain origin)
Pl. 24, fig. 2.

Sepals 5, united into a deeply 2-lipped calyx, closed in fruit, petals 5, purple or white, united into a 2-lipped corolla, upper lip entire, arched, lower lip spreading, 3-lobed, stamens 4, the lower or outer pair longer, ovary deeply 4-lobed, style 2-cleft; flowers in terminal spikes or heads with large, often colored bracts; leaves opposite, entire or toothed; perennial.

Leaves oblong to ovate, entire or toothed; flowers blue, 8-12 mm. long — *P. vulgáris*

SÁLVIA Linné 1753 SAGE
(Lat. *salvus*, well, from its medical properties)
Pl. 24, fig. 5.

Sepals 5, united into a 2-lipped calyx, petals 5, blue or bluish, united into a 2-lipped corolla, the upper lip concave or arched, entire to 2-lobed, lower lip spreading, 3-lobed, stamens with anthers 2, ovary 4-lobed, style 2-cleft; flowers in racemes, or spikes; leaves opposite, entire to toothed; annual or perennial.

1. Flowers 2-3 cm. long; stems 2-6 ft. high; perennial — *S. pítcheri*
2. Flowers 8-12 mm. long; .5-2 ft. high; annual — *S. lanceoláta*

SCUTELLÁRIA Linné 1753 SKULL-CAP
(Lat. *scutella*, flat dish, from the calyx)
Pl. 24, fig. 1.

Sepals 5, united into a swollen, 2-lipped calyx, lips entire, upper crested and usually falling in fruit, petals 5, blue to purple, united into a 2-lipped corolla, upper lip arched, the lower spreading, stamens 4, the lower or outer pair slightly longer, ovary deeply 4-lobed, style 2-cleft; flowers 1-3 in the axils or in spike-like racemes; leaves opposite, entire to toothed; annual or perennial.

1. Flowers 2-3 cm. long, solitary
   a. Stems 4-15 in. high; leaves usually sticky-hairy and entire; corolla much enlarged in the throat; in dry habitats — *S. resinósa*
   b. Stems 1-3 ft. high; leaves not sticky, toothed; corolla little enlarged; in wet habitats — *S. galericuláta*
2. Flowers 6-10 mm. long, in racemes; leaves ovate to lance-ovate, toothed — *S. lateriflóra*

STÁCHYS Linné 1753 WOUNDWORT
(Gr. *stachys,* spike, from the flower-cluster)
Pl. 24, fig. 6.

Sepals 5, united into a 5-toothed calyx, petals 5, purple to bluish, united into a 2-lipped corolla, upper lip erect, concave, lower lip spreading, 3-lobed, stamens 4, lower or outer pair longer, ovary 4-lobed, style 2-cleft; flowers in terminal spikes; leaves opposite, toothed; perennial.

Leaves lance-oblong, toothed; flowers purplish to reddish, 10-15 mm. long — *S. palústris*

TEÚCRIUM Linné 1753 GERMANDER, WOODSAGE
(Gr. *teukrion,* germander)

Sepals 5, united into an unequally 5-toothed calyx, petals 5, pink, purplish or white, united into an irregular 5-lobed corolla, the terminal lobe much the larger, the other lobes appearing lateral, giving the flower a one-lipped appearance, stamens 4, the lower or outer pair the longer, ovary 4-lobed, style 2-cleft; flowers in terminal spikes; leaves opposite, entire, toothed or cut; perennial.

1. Leaves pinnately cleft; flowers solitary, axillary — *T. laciniátum*
2. Leaves toothed; flowers in terminal spikes — *T. canadénse*

ROSALES ROSE ORDER
ROSÁCEAE ROSE FAMILY

Sepals 5, rarely 4-9, united, and often grown together with the ovary, petals usually 5, separate from each other, more or less united with the calyx, or lacking, stamens usually many, separate, pistils 1-many, separate or sometimes united with the calyx, ovary 1-celled with 1-several ovules, fruit follicles or achenes; flowers regular, usually perfect, solitary or clustered; herbs or shrubs with alternate simple or compound leaves.

1. Herbs
   a. Pistils 2-3
      (1) Flowers yellow, perfect; calyx bristly — AGRIMONIA
      (2) Flowers white, dioecious; calyx not bristly — ARUNCUS
   b. Pistils 5-many
      (1) Flowers white, rarely cream-colored or yellowish
         (a) Leaves simple, basal; fruits long-hairy — DRYAS
         (b) Leaves compound
            x. Leaves of 3-5 leaflets
               (x) Leaflets always 3; stems leafless, usually with runners — FRAGARIA

(y) Leaflets 3-5; stems trailing, leafy — RUBUS
y. Leaves pinnate of many leaflets; stems leafless — HORKELIA
(2) Flowers yellow, pink or purple, occasionally cream-colored or white
(a) Stamens 5; pistils 5-10
x. Petals white; leaves many-cleft into linear segments — CHAMAERHODUS
y. Petals yellow, small; leaves of 3 leaflets — SIBBALDIA
(b) Stamens 10-many; pistils many
x. Styles long, persistent and usually hooked or plumy in fruit
(x) Styles naked or plumy, bent or jointed; flowers yellow or purplish — GEUM
(y) Styles naked or plumy, straight, not jointed; flowers yellow or pink-purple — SIEVERSIA
y. Style short, falling away from the ripe achenes
(x) Styles attached at the base of the achenes; leaflets not silvery-silky — DRYMOCALLIS
(y) Styles lateral, attached near the middle of the achene; leaflets silvery-silky — ARGENTINA
(z) Styles terminal, attached near the tip of the achenes
m. Flowers yellow — POTENTILLA
n. Flowers red-purple — COMARUM

2. Shrubs
a. Leaves simple
(1) Flowers solitary, or 2-3 in a cluster
(a) Petals white
x. Stamens and pistils many; leaves roundish, 3-5-lobed — RUBUS
y. Stamens 10; pistils 5; leaves entire — KELSEYA
(b) Petals yellow or yellowish
x. Leaves 3-7-pinnatifid; style becoming long and plumy — COWANIA
y. Leaves 3-lobed at tip; style not long and plumy — PURSHIA
(c) Petals none

x. Leaves opposite; stems spiny; style not plumy — COLEOGYNE
y. Leaves alternate; stems not spiny; style long and plumy — CERCOCARPUS

(2) Flowers several-many in a cluster
(a) Leaves 3-7-cleft; style becoming long and plumy — FALLUGIA
(b) Leaves lobed, toothed or entire; style not plumy
x. Flowers in panicles
(x) Ovary and fruit 1-seeded — HOLODISCUS
(y) Ovary and fruit several-seeded — SPIRAEA
y. Flowers in corymbs or spikes
(x) Flowers in corymbs; leaves mostly 3-5-lobed; stems 1-6 ft. high — OPULASTER
(y) Flowers in spikes; leaves entire; stems dwarf, in mats — PETROPHYTUM

b. Leaves compound
(1) Flowers yellow; leaflets 5-7, entire — DASYPHORA
(2) Flowers white
(a) Flowers in a panicle; leaves twice-pinnately dissected — CHAMAEBATIARIA
(b) Flowers 1-few in a cluster; leaves pinnate of 3-5 leaflets — RUBUS
(3) Flowers rose to red, rarely white; leaves pinnate of 3-11 (usually 5-9) leaflets — ROSA

AGRIMÓNIA Linné 1753 AGRIMONY
(Of uncertain origin)

Sepals 5, forming a hemispheric to top-shaped tube with hooked bristles above, petals 5, yellow, stamens 5-15, carpels 2, stigma 2-lobed, fruit 1-2 achenes; flowers in spiked racemes; leaves alternate, odd-pinnate, with smaller lobes between the larger leaflets; perennial.

Stems 1-5 ft. high; leaves hairy to smooth; flowers 6-12 mm. wide — *A. eupatória*

ARGENTÍNA Lamarck 1778 SILVERWEED
(Lat. *argentinus*, silvery, from the leaves)

Sepals 5, united into a concave tube with 5 alternating bracts, petals 5, yellow, stamens 20-25, pistils many, style thread-like, attached near the

middle of the ovary; flowers solitary, axillary; leaves odd-pinnate, leaflets 7-25; perennial by runners.

Stems spreading, with runners; leaves silky-silvery below, smooth, hairy or silvery above *A. anserina*

ARÚNCUS Adanson 1763 GOATSBEARD
(Gr. *aryngos,* goatsbeard)

Sepals 5, united, petals 5, white, stamens many, inserted on the calyx, pistils usually 3, becoming smooth few-seeded follicles; flowers dioecious in panicled spikes; leaves 2-3-pinnate; perennial.

Stems 2-6 ft. high; leaves about 1 ft. long; flowers 2-4 mm. wide *A. silvéster*

CERCOCÁRPUS H. B. K. 1823 MOUNTAIN MAHOGANY
(Gr. *kerkos,* tail, *karpos,* fruit)
Pl. 26, fig. 7, 8.

Sepals 5, united into a narrow tube, contracted above, petals none, stamens 15-25 in 2-3 rows on the calyx, pistil 1, forming a hairy achene, style hairy, persistent, becoming long and plumy in fruit, seed 1; flowers perfect, axillary or terminal, solitary or clustered; leaves alternate, simple, leathery; shrubs.

1. Leaves toothed, hairy, oval to obovate or roundish *C. parvifólius*
2. Leaves entire, revolute, smooth, leathery, lance-oblong to linear *C. ledifólius*

CHAMAEBATIÁRIA Maximowicz 1879
(Resembling Chamaebatia, a low bramble)

Sepals 5, united into a calyx, petals 5, white, stamens many, pistils 5, hairy, follicles leathery, 1-valved, united at the base; flowers in terminal leafy panicles; leaves leathery, twice-pinnately dissected; shrub.

Stems diffusely branched; leaves narrowly lanceolate *C. millefólium*

CHAMAERHÓDUS Bunge 1829 GROUND ROSE
(Gr. *chamae,* on the ground, *rhodon,* rose)

Sepals 5, united into a bell-shaped calyx, petals 5, white, stamens 5, opposite the petals, pistils 5-10, style inserted near the base of the ovary; flowers in a two-forking cyme-like cluster; leaves once or twice ternately many-cleft; perennial.

Stems 4-12 in. high; basal leaves forming a rosette; petals obovate *C. erécta*

PLATE 25

ROSE FAMILY

1. Rosa acicularis: Rose
2. Potentilla gracilis
3. Sieversia turbinata
4. Sieversia ciliata
5. Dasyphora fruticosa
6. Drymocallis arguta

ROCKY MOUNTAIN FLOWERS

PLATE 25.

Coleógyne Torrey 1853
(Gr. *koleos*, sheath, *gyne*, pistil)

Sepals 4, yellow, petals 0, stamens many, style lateral, hairy at base, achene somewhat flattened, smooth; flowers terminal; leaves simple, leathery; somewhat spiny shrub.

Stems much branched; leaves linear-oblanceolate; flowers showy — *C. ramosíssima*

Cómarum Linné 1753
(The Greek name of the arbutus)

Sepals 5, united, with 5 bracts between them, petals 5, purple, stamens many on a hairy disk, pistils many, style lateral, achenes smooth, 1-seeded; flowers in cymes or solitary, terminal or axillary; leaves alternate, pinnate; perennial.

Stems prostrate; leaflets oblong to oval, 1-3 cm. long; flowers 2-3 cm. wide — *C. palústre*

Cowánia Don 1825 Apache Plume
(Named for Cowan, an English explorer)
Pl. 26, fig. 9.

Sepals 5, united into a top-shaped calyx, petals 5, yellow or yellowish, stamens many, inserted in 2 rows with the petals on the calyx-tube, pistils about 5, hairy, partly enclosed in the calyx-tube, styles becoming long plumy tails; flowers solitary or few in a cluster, terminal; leaves simple, leathery; shrub.

Stems 5-12 ft. high; leaves wedge-shaped, whitish below, .5-1 cm. long; flowers about 1 cm. wide — *C. mexicána*

Dasýphora Rafinesque 1838
(Gr. *dasys*, hairy, *phora*, bearing, perhaps from the shaggy achenes)
Pl. 25, fig. 5.

Sepals 5, united into a salver-form calyx with 5 alternating bractlets, petals 5, yellow, stamens about 20, style club-shaped, glandular above, inserted near the base of the ovary, stigma 4-lobed, achenes densely woolly as also the receptacle; flowers terminal, solitary or in few-flowered cymes; leaves pinnate of 5-7 leaflets; shrub.

Stems erect, .5-6 ft. high, rarely prostrate; leaflets oblong to oblanceolate, 1-3 cm. long; flowers 1.5-3.5 cm. wide — *D. fruticósa*

Dryas Linné 1753 Dryas

(Gr. *dryas*, wood-nymph)

Pl. 26, fig. 1.

Sepals 8-9, united, petals 8-9, white or yellow, stamens many on the calyx, pistils many, style terminal, persistent, becoming long and plumy in fruit; flowers solitary on leafless stalks; leaves simple, white beneath; low, tufted, herbaceous shrub.

Stems in a dense carpet; flowers-stalks 1-8 in. high; leaves oblong to obovate, 1-3 cm. long; flowers 2-3 cm. wide — *D. octopétala*

Drymocállis Fournier 1868

(Gr. *drymos*, oak-wood, *kallis*, beauty)

Pl. 25, fig. 6.

Sepals 5, united into a saucer-shaped calyx with 5 alternating bractlets, petals 5, creamy-white to yellow, stamens 20-30, in 5 groups, style inserted near the base of the ovary, thickened and glandular a little below the middle and tapering at both ends, stigma tiny; flowers in cymes; leaves pinnate, usually sticky-hairy; perennial.

Stems .5-4 ft. high; leaves usually sticky-glandular, more rarely smooth; flowers white, yellowish, or yellow; petals shorter, equalling or longer than the sepals — *D. argúta*

Fallúgia Endlicher 1840

(Named for Fallugio, an Italian botanist)

Pl. 26, fig. 2.

Sepals 5, united into a top-shaped calyx, with alternate narrow bractlets, petals 5, white, stamens many, inserted in 3 rows with petals upon the calyx, pistils many, enclosed in the calyx, style lateral, persistent, hairy at the base; flowers clustered; leaves pinnately lobed; low shrub.

Stems .5-6 ft. high; leaves hairy, lobes linear, 3-10 mm. long; flowers 1.5-3 cm. wide — *F. paradóxa*

Fragária Linné 1753 Strawberry

(Lat. *fragum*, strawberry)

Sepals 5, forming a top-shaped tube with 5 alternating bracts, petals 5, white, stamens many, pistils many on a convex or globoid receptacle which

becomes pulpy in fruit, styles lateral, achenes many, seed-like; flowers in corymbs or racemes on leafless stalks, perfect or dioecious; leaves alternate, basal, of 3-leaflets; perennial by runners.

1. Nutlets in distinct pits in the fleshy fruit *F. virginiána*
2. Nutlets on the surface of the fleshy fruit *F. vésca*

Géum Linné 1753 Avens
(Lat. name of the avens)

Sepals 5, united into a hemispheric or obconic tube, usually with 5 alternating bracts, petals 5, yellow or rose-purple, stamens many, pistils many, style thread-like, straight or jointed, persistent, somewhat hairy or plumose below; flowers solitary or in cyme-like clusters; leaves deeply pinnatifid to odd-pinnate; perennial.

1. Flowers yellow, erect; style bristle-like in fruit; terminal leaflet wedge-shaped, obovate or heart-shaped *G. strictum*
2. Flowers purple or purplish, nodding; style plumy in fruit *G. rivále*

Holodíscus Maximowicz 1879 Holodiscus
(Gr. *holos,* complete, *diskos,* disk)
Pl. 26, fig. 5.

Sepals 5, united into a saucer-shaped calyx, petals 5, white, stamens 20 on a circular disk about the ovary, pistils 5, becoming 1-seeded hairy fruits; flowers in terminal panicles; leaves alternate, simple, toothed or lobed; shrub.

Stems 1-10 ft. high; leaves spatulate or wedge-shaped to obovoid or ovate, toothed or lobed, silky beneath, .5-4 cm. long *H. dumósus*

Horkélia Chamisso and Schlechtendal 1827
(Named for Horkel, a German botanist)

Sepals 5, united into a calyx with 5 alternating bracts, petals 5, white or yellow, stamens 5-20 inserted on the calyx-tube, style thread-like, inserted near the base, pistils few; flowers in cymes or panicles; leaves pinnate with 10-20 pairs of leaflets; perennial.

Stems 4-8 in. high; petals spatulate, shorter than the sepals *H. górdoni*

KÉLSEYA Rydberg 1900
(Named for Kelsey, an American botanist)

Sepals 5, united into a hairy calyx, petals 5, white, stamens 10, inserted on the margin of the disk, pistils 5; flowers solitary and hidden at the ends of the branches; leaves simple, imbricated; tufted perennial.

Stems 3-4 in. high; leaves oblong-spatulate, 2-4 cm. long — *K. uniflóra*

OPULÁSTER Medicus 1799 NINEBARK
(Lat. name of the wild cranberry tree)
(Physocarpus Maxim.)
Pl. 26, fig. 4.

Sepals 5, united into a bell-shaped calyx, petals 5, white, on the throat of the calyx, stamens 20-40, inserted with the petals, pistils 1-5, stigma terminal, globose, pods 1-5, more or less inflated, 2-4-seeded, splitting when ripe; flowers in terminal corymbs; leaves simple, palmately lobed; shrub.

Bushy, 1-6 ft. high; carpels mostly 2-3, somewhat inflated or compressed, as long or longer than the calyx — *O. opulifólius*

PETRÓPHYTUM Nuttall 1840
(Gr. *petra,* rock, *phyton,* plant)

Sepals 5, united into a silky-hairy calyx, petals 5, white, stamens many, pistils 3-5, styles hairy below, follicles 1-2-seeded; flowers in a short spike; leaves entire, crowded into a rosette; stems woody, tufted or matted.

Stems in a dense mat; leaves oblong-spatulate, 8-10 mm. long — *P. caespitósum*

POTENTÍLLA Linné 1753 POTENTILLA, CINQUEFOIL
(Lat. *potens,* powerful, from reputed medical properties)
Pl. 25, fig. 2.

Sepals 5, united into a concave or hemispheric tube with 5 alternating bracts, petals 5, rarely 4, yellow, rarely white or purple, stamens many, seldom fewer, pistils many, style terminal, deciduous; flowers solitary or in cymes; leaves compound, digitate or pinnate; annual or perennial.

1. Flowers many in leafy cymes; leaves mostly of 3-5-leaflets, digitate; style swollen toward the base; mostly annuals
   a. Achenes with a large wart or swelling on the side — *P. paradóxa*

b. Achenes without a swelling
(1) Flowers mostly 8-12 mm. wide; stamens 15-20 *P. monspeliénsis*
(2) Flowers mostly 4-6 mm. wide; stamens 5-10 *P. rivális*

2. Flowers fewer and cymes less leafy; leaves mostly of 5-many leaflets; style not swollen at the base, except in perennials with well-developed rootstock
a. Leaflets digitate
(1) Leaflets 3, white-woolly beneath; style swollen toward the base *P. nívea*
(2) Leaflets 5-many
(a) Stems tufted, spreading, 1-4 in. high; leaflets 5, white-woolly beneath *P. concínna*
(b) Stems mostly erect, .5-3 ft. high; leaflets 5-9
x. Leaflets toothed or cleft to the base or nearly, smooth to white-woolly *P. grácilis*
y. Leaflets toothed or cleft little below the middle *P. dissécta*
b. Leaves pinnate, of 5-many leaflets
(1) Leaflets 5-7, small, usually less than .5 in. long *P. rubricáulis*
(2) Leaflets mostly 7-many, .5-3 in. long
(a) Style not longer than the mature achene, swollen below; leaflets mostly cleft or divided, green to white-woolly *P. pennsilvánica*
(b) Style usually longer than the mature achene, hardly or not at all swollen below; leaves silky-white to felted or nearly green; leaflets toothed to divided
x. Leaves mostly gray-woolly on one or both sides, more rarely green and smoothish; leaflets mostly 1-3 in. long *P. hippiána*
y. Leaves mostly green and smooth, more rarely white-hairy; leaflets mostly .5-1 in. long
(x) Leaflets toothed *P. criníta*
(y) Leaflets cleft or divided *P. platténsis*

PLATE 26

ROSES—PLUMS

ROSE FAMILY

1. Dryas octopetala
2. Fallugia paradoxa
3. Rubus deliciosus: Raspberry
4. Opulaster opulifolius: Ninebark
5. Holodiscus dumosus
6. Purshia tridentata
7. Cercocarpus parvifolius: Mountain Mahogany
8. Cercocarpus ledifolius
9. Cowania mexicana

APPLE FAMILY

10. Amelanchier alnifolia: Juneberry
11. Crataegus rivularis: Hawthorn
12. Peraphyllum ramossimum

PLUM FAMILY

13. Prunus demissa: Choke Cherry
14. Prunus pennsilvanica: Cherry
15. Prunus pumila: Sand Cherry

in each cell, styles 1-5, fruit a pome, i.e. the fleshy calyx-tube enclosing the bony, papery or leathery pistils or carpels; flowers regular, perfect, solitary or in racemes or cymes; trees or shrubs with alternate, simple or pinnate leaves.

1. Leaves simple
   a. Flowers solitary, or in racemes or in 2-3-flowered umbels
      (1) Leaves oblong-ovate or round; flowers white — AMELANCHIER
      (2) Leaves linear-oblanceolate; flowers pink — PERAPHYLLUM
   b. Flowers in corymbs; leaves double-toothed or 3-5-lobed — CRATAEGUS
2. Leaves pinnate; flowers in compound cymes — SORBUS

AMELÁNCHIER Linné 1753 JUNEBERRY

(The Savoy name)

Pl. 26, fig. 10.

Sepals 5, united into a bell-shaped tube, somewhat fused with the ovary, petals 5, white, stamens many, inserted on the throat of the calyx, styles 2-5, united, ovary wholly or partly inferior, 4-10-celled, fruit a small 4-10-celled berry-like pome; flowers in racemes or rarely solitary; leaves alternate, simple, serrate or entire; shrub or tree.

Stems 1-12 ft. high; leaves entire or serrate, smooth or hairy — *A. alnifólia*

CRATAÉGUS Linné 1753 HAWTHORN

(Gr. *krataigos,* hawthorn, from *krataios,* tough, strong)

Pl. 26, fig. 11.

Sepals 5, united into a cup- or bell-shaped tube, fused with the ovary, petals 5, white or pink, inserted on the calyx, stamens many, ovary inferior or nearly so, 1-5-celled, styles 1-5, fruit a small, drupe-like pome, containing 1-5 bony carpels, each usually 1-seeded; flowers in terminal corymbs; leaves alternate, doubly toothed, lobed or pinnatifid; trees or shrubs.

Shrubs or trees, 5-30 ft. high; leaves broadly spatulate to obovoid, usually with sharp or round shallow lobes, finely toothed, 1-3 in. long, .5-2 in. wide — *C. rivulàris*

PERAPHÝLLUM Nuttall 1838

(Gr. *pera,* leather pouch, *phyllon,* leaf)

Pl. 26, fig. 12.

Sepals 5, united, petals 5, pink, stamens many, inserted with the petals

on the calyx, ovary 2-celled, styles 2, fruit globose; flowers solitary or in sessile 2-3-flowered umbels; leaves clustered at the ends of the branches; low shrub.

Stems 2-6 ft. high; leaves linear-oblanceolate, toothed or entire; flowers pink — *P. ramosíssimum*

Sórbus Linné 1753 Mountain Ash
(Lat. name of the pear)

Sepals 5, united into an urn-shaped calyx, petals 5, white, stamens many, inserted with the petals on the calyx-tube, ovary inferior, styles usually 3, fruit a small red berry-like pome; flowers in terminal branched cymes; leaves alternate, pinnate, the leaflets toothed; trees or shrubs.

Trunks 10-30 ft. high; leaflets 7-15, serrate, oblong, 2-5 cm. long; flowers 7-10 mm. wide — *P. sambucifólia*

PRUNÁCEAE PLUM FAMILY

Sepals 5, united into a bell-shaped tube, free from the ovary, petals 5, white or pink, stamens many, inserted with the petals on the calyx, pistil 1, 1-celled, becoming a fleshy 1-seeded fruit with a stone; flowers regular, usually perfect, solitary or in racemes, umbels or corymbs; trees or shrubs with alternate, simple, toothed leaves.

Prúnus Linné 1753 Plum, Cherry
(The Latin name)
Pl. 26, fig. 13-15.

Characters of the family.

1. Flowers in umbels, appearing with or before the leaves; fruit 12-30 mm. in diam.
   a. Low shrubs, 1-4 ft. high; leaves elliptic to spatulate, toothed; flowers 8-12 mm. wide — *P. púmila*
   b. Tall shrubs, 6-20 ft. high; flowers 12-25 mm. wide
      (1) Leaves ovate, long-pointed; fruit 20-30 mm. wide — *P. americána*
      (2) Leaves lanceolate, acute; fruit 12-20 mm. wide — *P. angustifólia*
2. Flowers in corymbs or racemes, appearing after the leaves
   a. Flowers in corymbs, 12-15 mm. wide; fruit red — *P. pennsilvánica*

PLATE 27

PEA FAMILY

1. Thermopsis montana
2. Lupinus argenteus: Lupine
3. Petalostemon purpureus: Prairie Clover
4. Lathyrus ornatus: Sweet Pea
5. Vicia americana: Vetch

ROCKY MOUNTAIN FLOWERS

PLATE 27.

b. Flowers in racemes, 8-12 mm. wide; fruit dark purple to black *P. demissa*

MIMOSÁCEAE SENSITIVE PLANT FAMILY

Sepals 3-6, united, petals 3-6, alike, separate or united, stamens 3-12 or many, separate or united, ovary 1-celled, ovules several to many, fruit a legume; flowers regular in heads, spikes or racemes; herbs with alternate, twice-pinnate leaves; perennial.

1. Leaflets closing when touched; petals united about halfway; pod spiny SCHRANKIA
2. Leaflets hardly sensitive to touch; petals separate; pod smooth DESMANTHUS

DESMÁNTHUS Willdenow 1806 SENSITIVE PLANT
(Gr. *desmos*, band, *anthos*, flower)
(Acuan Medicus)

Sepals 5, united, petals 5, greenish or whitish, separate or nearly so, stamens 5 or 10, pod linear, flat, several-seeded, opening by 2 valves; flowers in axillary stalked heads; leaves twice pinnate, with many leaflets; perennial.

Stems 1-4 ft. high; pods many in a head, oblong-curved, 1-2 cm. long *D. illinoénsis*

SCHRÁNKIA Willdenow 1896 SENSITIVE BRIER
(Named for Schrank, a German botanist)

Sepals 4-5, united, petals 4-5, pink to purple, united about halfway, stamens 8-12, separate or united at the base, pod linear, spiny, several-seeded, opening by 4 valves; flowers perfect or polygamous in axillary stalked heads or spikes; leaves twice pinnate, sensitive, of many leaflets; perennial.

Stems spreading, prickly, 2-4 ft. long; flower heads 10-25 mm. wide; pods densely spiny, 4-5 cm. long *S. uncináta*

CASSIACEAE SENNA FAMILY

Sepals 5, separate or united, petals 5, separate, stamens 10 or less, separate or united, ovary 1-celled, fruit a legume, usually opening by 2 valves; flowers somewhat irregular in ours; annual or perennial herbs with solitary or clustered, alternate, simple or pinnate leaves.

1. Leaves once pinnate, not dotted with glands CASSIA
2. Leaves twice pinnate, usually black-dotted HOFFMANSEGGIA

CÁSSIA Linné 1753 PARTRIDGE PEA
(Gr. *cassia*, spice, from the Semitic)
(Chamaecrista Moench)
Pl. 29, fig. 2.

Sepals 5, united, petals 5, yellow, somewhat irregular, clawed, stamens 10, sometimes 5, often some imperfect, pod linear-oblong, flat with several-many seeds; flowers solitary; leaves alternate, even-pinnate; annual.

Stems 1-3 ft. high; leaflets oblong, 1-2 cm. long; flowers 2-4 cm. wide — *C. chamaecrista*

HOFFMANSÉGGIA Cavanilles 1797
(Named for Hoffmansegge)
Pl. 29, fig. 1.

Sepals 5, united, petals 5, yellow, regular or nearly so, stamens 10, separate, pod flat, linear to ovate, curved or straight, several-seeded; flowers in terminal or lateral racemes; leaves alternate, twice pinnate; annual or perennial.

1. Leaves, flowers and fruits dotted with black glands; pods 2-2.5 cm. long, 1 cm. wide, 2-3-seeded — *H. jámesi*
2. Plants without black dots; pods 3-4 cm. long, 5-8 mm. wide, 9-10-seeded — *H. drepanocárpa*

FABÁCEAE PEA FAMILY

Sepals 4-5, united into a calyx, rarely 2-lipped, petals usually 5, rarely 1, of 3 kinds, the large upper one or standard, 2 lateral wings and 2 intermediate ones forming a keel, stamens 10, rarely 9 or 5, separate, all united or nine united, pistil 1, simple, usually 1-celled but becoming 2-many-celled in fruit by cross partitions, ovules 1-many, fruit a legume, splitting by 2 valves, or indehiscent, occasionally a loment; flowers usually perfect, irregular, solitary or clustered; herbs, vines or shrubs with alternate usually compound leaves.

1. Herbs
   a. Leaves simple or apparently so — ASTRAGALUS
   b. Leaves of 3 leaflets
      (1) Leaflets entire
         (a) Stamens all separate from each other; flowers large, yellow — THERMOPSIS
         (b) Stamens with 9 united into a tube

x. Pod several-seeded, splitting; leaves not dotted
(x) Flowers 1-2 in a cluster — LOTUS
(y) Flowers several-many in a cluster — ASTRAGALUS
y. Pod 1-seeded, not splitting; leaves dotted with glands — PSORALEA
(2) Leaflets toothed
(a) Flowers in long tapering racemes — MELILOTUS
(b) Flowers in loose spikes or dense heads, the latter rarely 2-few-flowered
x. Flowers in loose spikes; pods coiled or curved, often spiny — MEDICAGO
y. Flowers in dense heads, rarely 2-few-flowered; pods straight — TRIFOLIUM
c. Leaves of 5-many leaflets
(1) Leaflets dotted with glands
(a) Leaves digitate, of 5 leaflets — PSORALEA
(b) Leaves pinnate, of 5-many leaflets
x. Pod with hooked prickles — GLYCYRRHIZA
y. Pod not prickly
(x) Stamens 10; flowers pea-like — DALEA
(y) Stamens 5; flowers not pea-like — PETALOSTEMON
(2) Leaves not dotted with glands
(a) Leaves odd-pinnate, not tendril-tipped
x. Pod much narrowed between the seeds, flat, necklace-like — HEDYSARUM
y. Pod not narrowed between the seeds
(x) Leaflets digitate, usually 5-11; stamens 10, all united — LUPINUS
(y) Leaflets pinnate
m. Stamens 10, all separate from each other — SOPHORA
n. Stamens 10, 9 united into a tube
(m) Tip of the keel with a point or hook — ARAGALUS
(n) Tip blunt or rounded, not pointed or hooked — ASTRAGALUS
(b) Leaves even-pinnate, usually tendril-tipped
x. Style thread-like, hairy-tufted at or near the apex — VICIA

y. Style flattened, hairs down the inner face — LATHYRUS

2. Shrubs or trees
   a. Leaflets dotted with glands, 8-25 pairs; flowers purple, small; petal 1 — AMORPHA
   b. Leaflets not dotted, 4-7 pairs; flowers rose-pink, pea-like — ROBINIA

AMÓRPHA Linné 1753 AMORPHA, FALSE INDIGO

(Gr. *a-*, without, *morphe*, form, from the absence of 4 petals)

Pl. 29, fig. 4-5.

Sepals 5, united into a bell-shaped calyx, petal 1, violet, blue or white, standard erect, folded about the stamens and the style, wings and keel lacking, stamens 10, united below, ovary 2-celled, pod hardly opening, 1-2-seeded; flowers in terminal spike-like racemes; leaves odd-pinnate, the leaflets dotted with tiny glands; shrubs.

1. Stems 3-15 ft. high; leaflets 2-5 cm. long; pods usually 2-seeded — *A. fruticósa*
2. Stems 1-3 ft. high; leaflets .5-1.5 cm. long; pods usually 1-seeded
   a. Leaflets densely gray-hairy, 21-49; flower-spikes usually several — *A. canéscens*
   b. Leaflets smooth, or nearly so, 13-19; flower-spikes solitary — *A. nána*

ARÁGALUS Necker 1790

(Possibly modeled after Astragalus, from Gr. *ara*, curse)

(Oxytropis DeCandolle; Spiesia Necker.)

Pl. 28, fig. 1; Pl. 29, fig. 11, 12.

Sepals 5, united into a nearly equally toothed calyx, petals 5, red, blue, yellowish or white, standard erect, wings oblong, keel with a distinct beak, stamens 10, 9 united, pod 1-2 celled, 2-valved; flowers mostly in racemes, spikes or heads; leaves odd-pinnate, typically hairy; mostly stemless perennials.

1. Flowers 6-7 mm. long; pods hanging, 5-6 times as long as the calyx — *A. defléxus*
2. Flowers 1-2 cm. long; pods not hanging, enclosed in the calyx, or 1-3 times longer

a. Leaflets of the leaf opposite
  (1) Pod enclosed in the calyx, or the tip projecting somewhat
    (a) Flowers 1-3, rarely 5, in a cluster, purple; pod in the inflated calyx — *A. múlticeps*
    (b) Flowers several in a dense head or spike; pod filling the calyx and often breaking it
      x. Mature calyx split down one side; flowers violet with oblong wings — *A. lágopus*
      y. Mature calyx not split; flowers purple to white, with dilated wings — *A. nánus*
  (2) Pod much longer than the calyx
    (a) Pod bladdery-inflated, ovate; flowers violet, 2 in a cluster — *A. podocárpus*
    (b) Pod not bladdery-inflated
      x. Flowers 1-3 in a cluster; pods oblong; leaflet pairs 7-9 — *A. párryi*
      y. Flowers several to many in a head or spike
        (x) Flower stalk and cluster somewhat sticky-hairy; leaflet pairs 10-25 — *A. víscidus*
        (y) Flower stalk and cluster not sticky-hairy
          m. Flowers 15-30 mm. long, red-purple to blue or white; leaflets silky or silvery to nearly smooth, lance-oblong to linear — *A. lambérti*
          n. Flowers 10-15 mm. long
            (m) Flowers purple or violet — *A. montícola*
            (n) Flowers yellow or yellowish
              r. Leaflets 8-13; flowers 3-8 in a cluster; calyx black-hairy — *A. alpícola*
              s. Leaflets 25-31; flowers many in a dense cluster; calyx white-silky — *A. villósus*
b. Leaflets irregularly crowded, in whorls; plants silvery-silky, 6-18 in. high; flowers blue, 10-15 mm. long, in a long densely silky spike — *A. spléndens*

PLATE 28

PEA FAMILY

1. Aragalus lamberti: Loco Weed
2. Medicago sativa: Alfalfa
3. Trifolium dasyphyllum: Clover
4. Psoralea tenuiflora
5. Trifolium namum: Dwarf Clover
6. Astragalus hypoglottis
7. Robinia neo-mexicana: Locust

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Astrágalus Linné 1753 Astragalus

(Greek name of a related plant)

Pl. 28, fig. 6; Pl. 29, fig. 13-28.

Sepals 5, united into a 5-toothed tube, petals 5, white, pink, red, blue or yellow, standard erect, wings oblong, keel blunt, stamens 10, 9 united, ovary 1-2-celled, many-seeded, pod 1-2-celled, fleshy to papery or woody, splitting or remaining closed; flowers in racemes or spikes, rarely solitary; leaves alternate, odd-pinnate, digitate or rarely simple; perennial or annual.

I. Leaves simple or of 3 leaflets

1. Leaves simple or apparently so, rarely of 3-5 leaflets or at first pinnate
   a. Leaves simple, or rarely of 3-5 leaflets
      (1) Flowers purple; racemes several-flowered; stems tufted or mat-like; leaves silky — *A. caespitósus*
      (2) Flowers yellowish; stems 1-2 ft. high; leaves smooth — *A. asclepiadoídes*
   b. Leaves apparently simple, due to the falling of the pinnate leaflets — *A. júnceus*
2. Leaves of 3 leaflets, silky-silvery; stems tufted
   a. Flowers purple
      (1) Flower cluster longer than the leaves; calyx partly enclosing the pod — *A. sericeus*
      (2) Flower cluster shorter than the leaves; calyx falling away — *A. tridactýlicus*
   b. Flowers yellowish to white; calyx enclosing pod — *A. triphýllus*

II. Leaves of 4-many leaflets, pinnate

1. Pods 1-celled, cross wall wanting or imperfect
   a. Leaflets 4-6, spiny-pointed; flowers 1-3, yellowish to purple — *A. centróphyta*
   b. Leaflets not spiny-pointed, usually 6-many
      (1) Leaflets not jointed to the axis, but seeming continuous with it, rigid, linear and persistent; flowers white or yellowish; pods usually hanging, often horizontal or ascending — *A. pectinátus*
      (2) Leaflets distinctly jointed by a petiole to the axis, not persistent

(a) Pods 2-grooved above, the midrib and edges making 3 ridges, stalked in the calyx, hanging
x. Flowers violet, 10-15 mm. long; pods about 15 mm. long — *A. bisulcátus*
y. Flowers white, purple-tipped, 7-10 mm. long; pods about 10 mm. long — *A. haydeniánus*
(b) Pods deeply grooved below, the midrib much intruded
x. Flowers white to yellowish; pods 2-3 cm. long, stalk usually longer than the calyx
(x) Stems and leaves long gray-hairy — *A. drummóndi*
(y) Stems and leaves fine-hairy or smooth
m. Calyx black-hairy; pod curved — *A. scopulórum*
n. Calyx white-hairy; pod mostly straight — *A. racemósus*
y. Flowers purple; pods about 1 cm. long, stalk equal to or shorter than the calyx
(x) Pod densely black-hairy; stalk equalling calyx — *A. alpínus*
(y) Pod not black-hairy; stalk shorter than calyx or none
m. Leaves ovate to rounded; pods mottled, little hairy — *A. sparsiflórus*
n. Leaves oblong to linear; pods not mottled, often shaggy — *A. humistrátus*
(c) Pods not grooved above or below, the lower midrib intruded little if at all
x. Pods distinctly to greatly inflated, papery; in one species less inflated and rather leathery, the upper midrib prominent
(x) Stems very short or lacking
m. Pods 6-15 mm. long, sessile, the upper midrib not acute and prominent
(m) Pods mottled, globose, smooth, 8-10 mm. wide; leaves linear to oblong — *A. jejúnus*

(n) Pods not mottled, hairy, ovoid, 6-15 mm. wide; leaflets lance-oblong
r. Leaflets 7-11; corolla whitish; stalks 1-3-flowered; pods ovate, 12-15 mm. long *A. humillimus*
s. Leaflets 9-13; corolla violet to white; stalks 5-12-flowered; pods ovoid, 6-7 mm. long *A. microcýstis*
n. Pods 2-3 cm. long, sessile, the upper midrib acute, prominent; stalk of flower cluster none or short to exceeding the leaves, the latter lanceolate to ovoid, gray-hairy; corolla yellow or yellowish *A. lotiflórus*
o. Pods 5-7 cm. long, stalk short, oblong-ovate; flowers yellow to white *A. megacárpus*
(y) Stems 5-20 in. high
m. Pods mottled with purple spots
(m) Leaflets linear or thread-like, some lacking, 1-5 cm. long; pods ovoid, stalk equal to calyx; flowers pale rose *A. píctus*
(n) Leaflets oval to roundish, about 1 cm. long; pods ovoid, stalk longer than calyx, jointed; flowers whitish *A. ártipes*
n. Pods not mottled, though sometimes purplish
(m) Pods smooth or nearly so
r. Flowers white
(r) Stalk of pod as long or longer than the calyx; clusters many-flowered *A. leptáleus*
(s) Stalk of pod none; clusters 2-4-flowered *A. americánus*
s. Flowers purple; stalk of pod short or none *A. eastwoódiae*

(n) Pods more or less hairy; flowers 3-15, yellowish or purplish; leaves linear to ovate *A. triflórus*

y. Pods not inflated

(x) Pods with an incomplete cross wall, caused by the intrusion of the lower midrib

m. Pods long-stalked

(m) Pods smooth; leaves linear to lance-oblong

r. Pods papery; leaflets 7-13, linear to lance-oblong; flowers white, tinged with violet *A. aborǐginum*

s. Pods leathery; leaflets 13-25, obovoid; flowers yellowish *A. beckwíthi*

(n) Pods black-hairy; leaves oblong to oval; flowers yellowish, tinged with purple *A. macoúni*

n. Pods not at all or scarcely stalked

(m) Wall of pod thin, soft and papery

r. Clusters many-flowered; flowers purple; leaves oval to oblong *A. élegans*

s. Clusters few-flowered; flowers white or yellowish, purple-tinged; leaves linear *A. brandégei*

(n) Wall of pod thick, stiff and leathery or woody

r. Stems tall, 1-4 ft., smooth; leaflets oblong to ovate; flowers white; pods tapering to a short stalk-like base *A. pattersóni*

s. Stems low, tufted, 1-8 in. high; leaves gray-hairy or silky

(r) Pods with long shaggy wool

h. Flowers purple; leaves nearly round, woolly *A. utahénsis*

i. Flowers yellowish

(h) Leaflets 3-7, obovate *A. newbérryi*
(i) Leaflets 9-17, lanceolate to oblong *A. púrshi*
(s) Pods short-hairy or smooth, not shaggy
h. Stems and leaves long-hairy; leaflets obovoid; flowers various *A. párryi*
i. Stems and leaves closely silky-hairy to nearly smooth
(h) Leaflets smooth above or nearly so *A. cibárius*
(i) Leaflets silvery-silky; flowers violet to purple
k. Pods tapering at the base *A. amphióxys*
l. Pods blunt at the base
(k) Pods 1.5-2.5 cm. long, mostly straight *A. missouriénsis*
(l) Pods 3-5 cm. long, mostly curved *A. shortiánus*
(y) Pods without a trace of an intruding partition
m. Pods hard and woody
(m) Flowers yellow; pods about 1 cm. long *A. flávus*
(n) Flowers purple to whitish; pods 4-8 mm. long, more or less concave below *A. grácilis*
n. Pods papery to leathery
(m) Stalk of pod usually twice as long as calyx; flowers white, 12-15 mm. long; pods 2-4 cm. long *A. macrocárpus*
(n) Stalk of pod usually shorter than calyx
r. Pods flattened

(r) Stalk of pod distinct, 1-3 mm. long; pods 8-12 mm. long; flowers white to yellowish, purple-tinged, keel rounded; leaflets 11-21 *A. tenéllus*

(s) Stalk none or minute

h. Pods oval to elliptic; pod 8-12 mm. long; flowers purplish; leaflets 9-13 *A. wingaténsis*

i. Pod oblong-linear to linear, 15-30 mm. long; flowers yellowish to purple, keel beaked

(h) Leaflets mostly thin and persistent, linear to elliptic *A. campéstris*

(i) Leaflets thickish, linear, usually falling away, leaving the linear leaf-like axis *A. júnceus*

s. Pods nearly round, little if at all flattened

(r) Pods linear, 2-3 mm. wide; flowers white to purplish, 8-10 mm. long *A. flexuósus*

(s) Pods oblong, 5-6 mm. wide; flowers purple

h. Flowers 14-16 mm. long in a head; pods smooth *A. hálli*

i. Flowers 8-10 mm. long in a loose raceme; pods finely hairy *A. fendleri*

2. Pods completely 2-celled

a. Pods fleshy, plum-like, not splitting when ripe, 2-4 cm. long; flowers deep red to purple or white; leaflets linear to oblong or obovoid *A. crassicárpus*

b. Pods papery and inflated, ovate, usually mottled, splitting when ripe, 1.5-3 cm. long; flowers purple to white or yellowish; leaflets obovate to elliptic or oblong *A. diphýsus*

c. Pods neither fleshy nor inflated and papery
(1) Pods linear-oblong, flattened, 12-25 mm. long, 2-3 mm. wide
(a) Plants stemless or nearly so, silvery-silky *A. scapósus*
(b) Plants stemmed, 3-15 in. high, finely hairy *A. nuttalliánus*
(2) Pods ovate to broadly oblong
(a) Stems and leaves densely woolly or felted; leaflets 15-29; corolla purple
x. Pods smooth *A. mollíssimus*
y. Pods densely woolly *A. bigelóvi*
(b) Stem and leaves not densely woolly, but smooth or finely hairy
x. Flowers yellowish to greenish; stems 1-5 ft. high; flowers spreading or reflexed in a long cluster; pods smooth *A. caroliniánus*
y. Flowers blue to purple, more rarely whitish or yellowish, ascending, in a head-like cluster
(x) Flower cluster ovoid; calyx black-hairy; leaflets mostly less than 1 cm. long; pods with long spreading hairs *A. hypoglóttis*
(y) Flower cluster usually oblong; calyx white-hairy; leaflets 1-2 cm. long; pods with close gray or black hairs *A. adsúrgens*

DÁLEA Jussieu 1789 DALEA
(Named for Dale, an English botanist)
(Parosela Cavanilles 1802)
Pl. 29, fig. 6.

Sepals 5, united into an equally toothed tube, petals 5, purple, red, yellow, or white, often long-clawed, wings and keel united below to the stamen-tube, stamens 10 or 9, united, pod enclosed in the calyx, usually 1-seeded and remaining closed; flowers in racemes or spikes; leaves odd-pinnate of 3-41 leaflets, dotted with tiny glands; herbs or shrubs.

1. Flowers white, rose or purple, not yellow; plants mostly smooth
a. Leaflets 5-13; flowers in a loose cluster
(1) Stems shrubby; flowers rose-purple *D. formósa*
(2) Stems herbaceous

PLATE 29

PEAS

SENNA FAMILY

1. Hoffmanseggia jamesi
2. Cassia chamaecrista: Partridge Pea

PEA FAMILY

3. Sophora sericea
4. Amorpha nana
5. Amorpha fruticosa
6. Dalea jamesi
7. Hedysarum americanum
8. Glycyrrhiza lepidota: Wild Liquorice
9. Melilotus alba: Sweet Clover
10. Lotus wrighti: Trefoil
11. Aragalus deflexus: Loco Weed
12. Tip of keel of Aragalus
13. Tip of keel of Astragalus

14–28. Pods of Astragalus: natural size

14. Astragalus bisulcatus: pod and cross section
15. Astragalus drummondi: pod and cross section
16. Astragalus triflorus
17. Astragalus aboriginum
18. Astragalus elegans
19. Astragalus shortianus: pod and cross section
20. Astragalus gracilis: pod and cross section
21. Astragalus macrocarpus
22. Astragalus flexuosus
23. Astragalus halli
24. Astragalus crassicarpus: pod and cross section
25. Astragalus diphysus
26. Astragalus nuttallianus
27. Astragalus bigelovi
28. Astragalus carolinianus

(a) Flowers white — *D. enneándra*
(b) Flowers red to purple — *D. lanáta*

b. Leaflets 13-41; flowers in a dense spike, white or pink. — *D. alopecuroides*

2. Flowers yellow, or fading to purple
a. Leaflets 3, palmate; flowers becoming purple — *D. jámesi*
b. Leaflets 5-7, sometimes 3, pinnate; flowers permanently yellow or becoming purple — *D. aúrea*

GLYCYRRHÍZA Linné 1753 WILD LIQUORICE
(Gr. *glykys*, sweet, *rhiza*, root)
Pl. 29, fig. 8.

Sepals 5, united into a tube, petals 5, white, stamens 10, 9 united, pod covered with prickles, remaining closed or nearly so; flowers in spikes; leaves odd-pinnate, of 11-19 leaflets; perennial.

Stems 1-6 ft. high; leaflets lanceolate to ovate, 2-4 cm. long — *G. lepidóta*

HEDÝSARUM Linné 1753
(Gr. *hedysaron*, the name of a vetch)
Pl. 29, fig. 7.

Sepals 5, united into a tube, petals 5, violet, purple, yellow or white, keel longer than the wings, stamens 10, 9 united, pod flat, constricted into joints; flowers in axillary racemes; leaves odd-pinnate of 11-23 leaflets.

Plants .5-3 ft. high, smooth or hairy; flowers blue to purple, yellow or white, 10-15 mm. long; calyx-teeth shorter to longer than the tube — *H. americánum*

LÁTHYRUS Linné 1753 LATHYRUS, SWEET PEA
(Gr. *lathyros*, a kind of pulse)
Pl. 27, fig. 4.

Sepals 5, united into a tube, sometimes with slightly unequal teeth, petals 5, purple, blue, violet, yellowish or white, standard notched, wings and keel somewhat united, stamens 10, all united or 1 free, style hairy down the inner side, pod flat or somewhat rounded, splitting; flowers in racemes or sometimes solitary; leaves pinnate, of 6-12 leaflets, usually tendril-bearing at the tip; perennial.

1. Flowers purple, 2-3 cm. long; leaves with or without tendrils; leaflets linear to lanceolate or oblong, mostly smooth, sometimes gray-hairy — *L. ornátus*

2. Flowers white, or yellowish, 12-20 mm. long
   a. Leaflets linear to oblong, 3-20 times longer than wide; stems erect, 4-12 in. high — *L. arizónicus*
   b. Leaflets ovate, mostly less than twice as long as wide, or rounded; stems climbing or trailing, 1-3 ft. high — *L. ochroleúcus*

Lótus Linné 1753 Trefoil
(The Greek for various plants)
Pl. 29, fig. 10.

Sepals 5, united into a tube, petals 5, reddish to yellow or white, stamens 10, 9 united, pod linear to oblong, somewhat flattened, splitting when mature; flowers solitary or clustered; leaves of 3 leaflets, rarely of a single leaflet; annual or perennial.

1. Leaflets 3-5, oblong to linear; calyx teeth and tube about equal; keel not attenuate-curved; perennial — *L. wríghti*
2. Leaflets 3, rarely 1 or 4, lance-ovate; calyx teeth much longer than the tube; keel attenuate-curved; annual — *L. purshiánus*

Lupínus Linné 1753 Lupine
(The Latin name)
Pl. 27, fig. 2.

Sepals 5, united into a 2-lipped calyx, petals 5, purple, blue, pink, white or yellow, standard with reflexed margins, wings oblong to obovate, keel incurved, stamens 10, united, ovary 1-celled, pod flattened, leathery; flowers in terminal spikes or racemes; leaves alternate, digitate, of 3-15 leaflets; perennial or annual.

1. Low annuals, 2-8 in. high, with long hairs; pods mostly 1-2-seeded
   a. Racemes oblong to elongate; lower calyx lip entire or nearly so — *L. pusíllus*
   b. Racemes head-like; lower calyx lip 2-3-toothed — *L. kíngi*
2. Perennials, usually 1-4 ft. high; pods mostly 3-8-seeded
   a. Plants low, tufted, often nearly stemless, 1-6 in. high; flowers 5-7 mm. long — *L. caespitósus*
   b. Plants not tufted, 1-3 ft. high; flowers 6-18 mm. long
      (1) Flowers 6-12 mm. long; calyx rounded to spurred; leaves smooth to hairy or silky — *L. argénteus*

(2) Flowers 12-18 mm. long
(a) Banner hairy — *L. sericeus*
(b) Banner smooth or nearly so
x. Leaflets 2-5 in. long, smooth or finely hairy — *L. burkei*
y. Leaflets 1-2 in. long, more or less silky — *L. ornatus*

MEDICÁGO Linné 1753 ALFALFA, NONESUCH
(Gr. *medike*, alfalfa, Lat. *ago*, like)
Pl. 28, fig. 2.

Sepals 5, united, petals 5, yellow or purple, stamens 10, 9 united, ovary 1-several-ovuled, pod curved or spirally twisted, netted or spiny, remaining closed, 1-few-seeded; flowers in axillary heads or racemes; leaves alternate, of 3 toothed leaflets; annual or perennial.

1. Flowers blue-purple, 5-7 mm. long; pods with 2-3 spirals — *M. sativa*
2. Flowers yellow, 2-3 mm. long; pods with a partial spiral — *M. lupulina*

MELILÓTUS Linné 1753 SWEET CLOVER
(Gr. *mel.*, honey, *lotus*, a plant, from its fragrance)
Pl. 29, fig. 9.

Sepals 5, united, petals 5, white or yellow, stamens 10, 9 united, ovary with few ovules, pod usually remaining closed, with 1-few seeds; flowers in racemes; leaves of 3 toothed leaflets; annual or biennial.

1. Flowers white, standard larger than wings — *M. alba*
2. Flowers yellow, standard and wings equal — *M. officinalis*

PETALOSTÉMON Michaux 1803 PRAIRIE CLOVER
(Gr. *petalon*, petal, *stemon*, stamen, the two grown together)
(Kuhnistera Lamarck)
Pl. 27, fig. 3.

Sepals 5, united into a bell-shaped calyx with nearly equal teeth, petals 5, white to pink or purple, on long slender claws, standard large, wings and keel petals similar, their claws grown to the stamen-tube, stamens 5, ovary sessile, 2-ovuled; pod enclosed in the calyx, 1-2-seeded; flowers curiously irregular, not pea-like, in dense spikes or heads; leaves alternate, odd-pinnate, dotted with glands; perennial.

1. Flowers white
   a. Spike of flowers densely silky-hairy — *P. compáctus*
   b. Spike of flowers smooth; leaflets linear-oblong to spatulate or obovate — *P. cándidus*
2. Flowers rose-pink, rarely white
   a. Leaflets 3-5, linear; plants smooth or sparsely hairy — *P. purpúreus*
   b. Leaflets 7-17, linear-oblong to oblanceolate; plants densely hairy — *P. villósus*

PSORÁLEA Linné 1753 PSORALEA
(Gr. *psoraleos*, scabby, from the dotted leaves)
Pl. 28, fig. 4.

Sepals 5, equal or the lower longest, united into a bell-shaped calyx, petals 5, white to blue, stamens 10, 9 or all united, pod ovoid, not splitting, 1-seeded; flowers in spikes or racemes; leaves digitate, of 1-5 leaflets; annual or perennial.

1. Flowers 4-8 mm. long, in racemes or open spikes; root not tuberous; stems 1-4 ft. high
   a. Plants densely silvery-silky; flowers in open spikes
      (1) Leaflets oblong to obovate; one calyx lobe much the longest — *P. argophýlla*
      (2) Leaflets linear to oblanceolate; calyx lobes nearly equal — *P. digitáta*
   b. Plants green or greenish, smooth or hairy; flowers in racemes or dense spikes
      (1) Plants smooth or nearly so; spikes short and dense; pods nearly round — *P. lanceoláta*
      (2) Plants finely gray-hairy; flowers in racemes; pods ovoid to lance-ovate
         (a) Leaflets oblong to ovate or obovate — *P. tenuiflora*
         (b) Leaflets narrowly linear — *P. linearifólia*
2. Flowers 10-16 mm. long, in dense spikes; root tuberous; stems mostly a foot or less high
   a. Plants with long spreading hairs
      (1) Stemless or nearly so; leaflets linear to oblong — *P. hypogaéa*
      (2) Stems 4-15 in. high; leaflets spatulate to obovate — *P. esculénta*

b. Plants with fine, closely appressed hairs
(1) Plants low, nearly stemless *P. mephítica*
(2) Plants 1-2 ft. high *P. cuspidáta*

Robínia Linné 1753 Locust
(Named for the brothers Robin)
Pl. 28, fig. 7.

Sepals 5, united into a tube, the 2 upper teeth also somewhat united, petals 5, white to rose, standard large, reflexed, stamens 10, 9 united, ovary stalked, ovules many, pod linear, flat, opening by 2 valves; flowers in axillary or terminal racemes; trees or shrubs with odd-pinnate leaves.

Shrubs 3-15 ft. high; leaflets oblong to elliptic; clusters large; flowers 15-25 mm. long *R. neo-mexicána*

Sophóra Linné 1753 Sophora
(From the Arabic word for yellow)
Pl. 29, fig. 3.

Sepals 5, united into a bell-shaped tube, petals 5, white, stamens 10, distinct from each other or nearly so, ovary short-stalked, ovules many, pod stalked, terete, constricted between the seeds, usually remaining closed; flowers in terminal racemes or panicles; leaves odd-pinnate; perennial.

Stems 4-12 in. high; leaflets oblong to obovate, 5-15 mm. long; flowers 15-16 mm. long *S. sericea*

Thermópsis R. Brown 1811 Thermopsis
(Gr. *thermos,* lupine, *opsis,* likeness)
Pl. 27, fig. 1.

Sepals 5, united, the 2 upper ones also sometimes united with each other, petals 5, yellow, stamens 10, separate, ovary sometimes short-stalked, ovules many, pod linear to oblong, flat, straight or curved; flowers in terminal or axillary racemes; leaves alternate of 3 leaflets; perennial.

1. Pods erect or ascending, straight or slightly curved *T. montána*
2. Pods horizontal, reflexed, strongly curved *T. rhombifólia*

Trifólium Linné 1753 Clover, Alsike
(Lat. *tri-,* three, *folium,* leaf)
Pl. 28, fig. 3, 5.

Sepals 5, united into a bell-shaped calyx, petals 5, white, pink, red or yellow, usually persistent, stamens 10, 9 united, pod usually not splitting, 1-6-seeded; flowers in dense heads or spikes, often with an involucre; leaves of 3 leaflets, the latter toothed; annual or perennial.

1. Heads with a row of bracts at base, i.e., an involucre
   a. Plants tufted, mat-like, nearly stemless; bracts separate or nearly so
      (1) Leaflets entire, usually silky-hairy
         (a) Heads on a distinct, often long, stalk; bracts awl-shaped, often tiny — *T. dasyphýllum*
         (b) Heads nearly sessile; bracts 2, of 3 leaflets each — *T. andínum*
      (2) Leaflets toothed, smooth or nearly so; bracts oblong to obovate, blunt, entire — *T. párryi*
   b. Plants with leafy stems, 4-20 in. high; bracts united, the lobes long-pointed and usually toothed; leaflets toothed, narrowly oblanceolate to obovate — *T. involucrátum*
2. Heads without an involucre
   a. Stems low, tufted; leaves basal
      (1) Flowers 1.2-3 cm. long; leaves smooth or nearly so
         (a) Flowers 1-3, 1.5-3 cm. long; leaflets mostly oblanceolate, toothed — *T. nánum*
         (b) Flowers mostly 10 or more, 12-15 mm. long
            x. Leaflets toothed, ovate to nearly round, 1-1.5 cm. long — *T. háydeni*
            y. Leaflets entire, elliptic to oblong, 1.5-2 cm. long — *T. brandégei*
      (2) Flowers 7-9 mm. long, several in a head; leaves hairy, ovate to oblong, toothed — *T. gymnocárpum*
   b. Stems leafy, scarcely tufted
      (1) Heads sessile; flowers red; leaves hairy — *T. praténse; red clover*
      (2) Heads on a distinct, often long, stalk
         (a) Stems creeping; heads white, on stalks 3-6 in. high; leaves ovate to roundish, toothed — *T. répens; white clover*
         (b) Stems erect, .5-3 ft. high
            x. Cultivated or escaped from cultivation into roadsides and fields

(x) Heads globose, pink to white; calyx and leaves smooth — *T. hýbridum; alsike*

(y) Heads usually oblong to elongate, red; calyx and leaves hairy — *T. incárnatum; crimson clover*

y. Native; heads globose to oblong, yellowish, white or purplish; calyx usually long-hairy; leaflets lanceolate or ovate, hairy to smooth — *T. lóngipes*

Vícia Linné 1753 Vetch
(The Latin name)
Pl. 27, fig. 5.

Sepals 5, united, the 2 upper somewhat longer, petals 5, blue, violet or yellow, rarely white, wings somewhat adherent to the keel, stamens 10, 9 or sometimes all united, style with a tuft of hairs at the tip, pod flat, splitting by 2 valves; flowers usually in axillary racemes; leaves alternate, pinnate, tendril-bearing; annual or perennial vines.

1. Flowers 10-25 mm. long, 3-40 in a cluster, variously blue-purple; leaflets linear to oblong or ovoid, smooth or hairy, round or truncate at tips; stipules various — *V. americána*
2. Flowers 5-6 mm. long, 1-2 in a cluster, yellowish, with purple tip; leaflets linear to oblong — *V. prodúcta*

CRASSULACEAE STONECROP FAMILY

Sepals 4-5, separate or united, free from the ovary, petals 4-5, distinct or slightly united at the base, rarely wanting, stamens 4-10, pistils 4-5, distinct or united below, ovules numerous in 2 rows, follicles 1-celled, splitting; flowers regular, usually in cymes, clusters often head-like; herbs with simple fleshy leaves.

1. Stamens 8-10; flowers clustered; leaves fleshy
   a. Flowers pink to purple or dark red
      (1) Flowers pink, rarely white, axillary in racemes — Clementsia
      (2) Flowers purple to red-brown, terminal — Rhodiola
   b. Flowers yellow, in spreading 1-sided racemes — Sedum
2. Stamens 3-5; leaves hardly fleshy — Tillaeastrum

CLEMÉNTSIA Rose 1903
(Sedum Linné)
Pl. 30, fig. 1.

Sepals 4-5, united, petals 4-5, rose to nearly white, separate, stamens 8-10, pistils 4-5, separate or united at the base; flowers perfect, axillary in dense racemes, forming a head or spike-like cluster; leaves more or less crowded, fleshy, usually toothed; perennial.

Stems 4-18 in. high; leaves oblong to oblanceolate, entire or toothed, 1-4 cm. long; petals lanceolate, 8-15 mm. long *C. rhodántha*

RHODÍOLA Linné 1753 KING'S CROWN
(Gr. *rhodon,* rose, perhaps from the rose-like odor of the root)
(Sedum Linné)
Pl. 30, fig. 3.

Sepals 4-5, united, petals 4-5, red-purple, separate, stamens 8-10, pistils 4-5, separate or united at the base; flowers polygamous or dioecious in a compound cyme, the latter dense and head-like; leaves crowded, fleshy, flat, entire or toothed; perennial.

Stems 1-25 cm. high; leaves obovate to oblong, entire or dentate, .5-2.5 cm. long; flowers 4-8 mm. wide *R. rósea*

SÉDUM Linné 1753 STONECROP
(Lat. *sedeo,* sit, from growing on walls and rocks)
Pl. 30, fig. 8.

Sepals 4-5, united, petals 4-5, yellow, separate, stamens 8-10, alternate ones usually attached to the petals, pistils 4-5, distinct or united at the base; flowers perfect as a rule, in terminal, usually 1-sided cymes; leaves alternate, often crowded, fleshy, entire or toothed; annual or perennial.

1. Leaves linear-cylindric; petals distinct
   a. Leaves flat above; stems branched at base, 5-12 in. high *S. douglási*
   b. Leaves round above; stems simple, tufted, 1-8 in. high *S. stenopétalum*
2. Leaves elliptic to obovate; petals united at base *S. débilis*

TILLAEÁSTRUM Britton 1903
(Named from its resemblance to Tillaea)

Sepals 3-5, united, petals 3-5, greenish, separate or united, stamens

PLATE 30

STONECROPS AND SAXIFRAGES

STONECROP FAMILY

1. Clementsia rhodantha
3. Rhodiola rosea: King's Crown
8. Sedum stenopetalum: Stonecrop

SAXIFRAGE FAMILY

2. Saxifraga chrysantha: Saxifrage
4. Ribes lacustre: Gooseberry
5. Saxifraga punctata: Saxifrage
6. Ribes leptanthum: Gooseberry
7. Saxifraga bronchialis: Saxifrage
9. Saxifraga jamesi
10. Saxifraga flagellaris

ROCKY MOUNTAIN FLOWERS

PLATE 30.

3-5, pistils 3-5, separate, follicles few-several-seeded; flowers solitary or cymose, axillary or terminal; leaves fleshy, opposite, entire; aquatic or marsh herb.

Stems 1-6 cm. long; leaves linear-oblong, 4-6 mm. long; flowers 1 mm. wide — *T. aquáticum*

SAXIFRAGACEAE SAXIFRAGE FAMILY

Sepals mostly 5, united, free or grown to the ovary, petals 4-5, rarely none, stamens 4-10, pistils 1-several, often 2, separate or united, styles separate or united into one, fruit a capsule, follicle or berry; flowers perfect to dioecious, solitary or variously clustered; herbs or shrubs with alternate or opposite leaves.

1. Herbs
   - a. Stamens with anthers 5, rarely 4
     - (1) Leaves entire; flowers flat, saucer-shaped — PARNASSIA
     - (2) Leaves toothed or lobed; flowers bell-shaped
       - (a) Petals cut or fringed — MITELLA
       - (b) Petals entire
         - x. Ovary 1-celled, 2-beaked; common — HEUCHERA
         - y. Ovary 2-celled, 2-beaked, very rare — SULLIVANTIA
   - b. Stamens 8-10
     - (1) Petals present; stamens 10
       - (a) Petals entire — SAXIFRAGA
       - (b) Petals 3-7-parted — LITHOPHRAGMA
     - (2) Petals absent, sepals yellowish; stamens usually 8 — CHRYSOSPLENIUM
2. Shrubs
   - a. Stamens 8-10
     - (1) Leaves alternate, lobed; ovary inferior; fruit a berry — RIBES
     - (2) Leaves opposite, not lobed; ovary partly inferior; fruit a capsule
       - (a) Leaves entire; flower solitary or 2-3; stamens 8 — FENDLERA
       - (b) Leaves toothed; flowers several in a cluster; stamens 10 — JAMESIA
   - b. Stamens many; ovary inferior; flowers large, white, solitary — PHILADELPHUS

Chrysosplénium Linné 1753 Golden Saxifrage

(Gr. *chrysos,* gold, *splen,* spleen)

Sepals 4-5, united into an urn-shaped calyx, grown to the ovary, petals none, stamens 4-10, ovary 1-celled, 2-lobed, styles 2, capsule 2-lobed, 2-valved above; flowers tiny, greenish, solitary or clustered, axillary or terminal; leaves opposite or alternate, toothed; perennial.

Stems 2-6 in. high; leaves alternate, round, 1-3 cm. wide; flowers 2 mm. wide — *C. tetrándrum*

Féndlera Englemann and Gray 1852

(Named for Fendler, an American botanical collector)

Pl. 31, fig. 11.

Sepals 5, united, grown together with the ovary, petals 4, separate, white, stamens 8, ovary 3-4-celled, capsule hard, splitting; flowers terminal, solitary or in 3-flowered cymes; leaves opposite, entire; shrub.

Stems 4-15 ft. high; leaves oblong, 1-3 cm. long; flowers 1.5-2.5 cm. wide — *F. rupícola*

Heúchera Linné 1753 Heuchera

(Named for Heucher, a German botanist)

Pl. 31, fig. 6.

Sepals 5, united into a saucer- or bell-shaped calyx, grown to the base of the ovary, petals 5, white, green or purplish, often tiny, inserted on the throat of the calyx, stamens 5, inserted with the petals, ovary 1-celled, styles 2, capsule 2-beaked, 2-valved; flowers in panicles or racemes; leaves mostly basal, simple, lobed; perennial.

1. Stamens projecting more or less
   - a. Flowers in a dense cylindric spike; stems 4-10 in. high — *H. bracteáta*
   - b. Flowers in a panicle or a loose interrupted spike
     - (1) Flowers in an open panicle; flower stalks smooth; leaves 1-2.5 cm. long — *H. rubéscens*
     - (2) Flowers in a spike-like panicle; flower stalks bristly hairy; leaves 3-8 cm. long — *H. híspida*
2. Stamens included in the calyx tube
   - a. Calyx bell-shaped, whitish to pinkish
     - (1) Petals none or minute; leaves and flower stalks densely hairy; leaf lobes with round teeth — *H. ovalifólia*

(2) Petals distinct, spatulate and clawed; leaves and flower stalks sparsely hairy; leaf lobes with spiny teeth *H. hálli*

b. Calyx saucer-shaped, greenish; petals tiny *H. parvifólia*

JÁMESIA Torrey and Gray 1840
(Named for James, an American botanist)
Pl. 31, fig. 9.

Sepals 5, united into a calyx, grown together with the ovary, petals 5, white, stamens 10, the alternate shorter, ovary 1-celled, styles 3-5; flowers in terminal clusters; leaves opposite, simple, toothed; shrub.

Stems 2-6 ft. high; leaves gray-hairy below, 2-5 cm. long; flowers 1-2 cm. wide *J. americána*

LITHOPHRÁGMA Nuttall 1840
(Gr. *lithos,* stone, *phragma,* hedge)
Pl. 31, fig. 4.

Sepals 5, united into a bell- or top-shaped calyx, somewhat grown to the ovary at the base, petals 5, white or pink, 3-7 parted, stamens 10, styles 2-3; flowers in terminal racemes; leaves mostly basal, palmately divided or parted; perennial.

1. Calyx bell-shaped, free from the ovary *L. tenélla*
2. Calyx top-shaped, united to the lower half of the ovary *L. parviflóra*

MITÉLLA Linné 1753 MITREWORT
(Gr. *mitra,* turban, from the form of the pod)
Pl. 31, fig. 5.

Sepals 5, united into a bell-shaped calyx, grown to the base of the ovary, petals 5, white to greenish-yellow, cleft or pinnatifid, stamens 10 or 5, ovary 1-celled, styles 2, capsule 2-valved at the tip; flowers in spike-like racemes; leaves mostly basal, simple; perennial.

1. Petals yellowish, 7-9-pinnatifid; stigma 2-lobed; stamens opposite the petals *M. pentándra*
2. Petals white, trifid to entire; stigma entire; stamens alternate with the petals *M. trífida*

PARNÁSSIA Linné 1753 PARNASSIA
(Named from Mount Parnassus)
Pl. 31, fig. 8.

Sepals 5, united into a short tube, free from or grown to the ovary,

petals 5, white or cream-colored, stamens with anthers 5, imperfect stamens or staminodia usually many in clusters at the base of each petal, ovary 1-celled, ovules many, stigmas usually 4, capsule 1-celled, opening by 4 valves; flowers solitary, terminal; leaves mostly basal, entire; perennial.

1. Petals fringed on the edges, with a short claw or stalk — *P. fimbriáta*
2. Petals not fringed and without a claw
   a. Leaves all basal; sterile stamens 3-5 in a cluster — *P. kotzebúei*
   b. Stem bearing a leaf near the middle; sterile stamens 5-15 in a cluster
      (1) Petals 5-8 mm. long; leaves tapering at base — *P. parviflóra*
      (2) Petals 10-12 mm. long; leaves heart-shaped at base — *P. palústris*

Philadélphus Linné 1753 Mock Orange

(Gr. *philadelphon*, a sweet-flowering shrub)

Pl. 31, fig. 10.

Sepals 4-5, united into a top-shaped calyx, grown to the ovary, petals 4-5, white, separate, stamens 20-40, ovary 3-5-celled, styles 3-5, separate or united at base, capsule top-shaped, splitting by 3-5 valves; flowers solitary or clustered, terminal or axillary; leaves opposite, simple; shrub.

Leaves smooth or hairy, 1-3 cm. long; flowers 2-3.5 cm. wide — *P. microphýllus*

Ríbes Linné 1753 Currant, Gooseberry

(From the German *riebs*, gooseberry)

Pl. 30, fig. 4, 6; pl. 31, fig. 12, 13.

Sepals 4-5, united into a cylindric-, saucer-, or bell-shaped calyx, green, white, pink or yellow, petals 4-5, stamens 4-5, inserted with the petals on the throat of the calyx, ovary 1-celled, styles 2, separate or united, fruit a berry; flowers in racemes or 1-few in axillary clusters; leaves alternate, often clustered, usually lobed; shrubs.

1. Stems prickly, and often bristly
   a. Flower saucer-shaped; berry usually bristly, red or black — *R. lacústre*
   b. Flower bell-shaped to tubular; berry usually smooth
      (1) Calyx hairy — *R. leptánthum*

(2) Calyx smooth
(a) Calyx lobes longer than tube; fruit smooth — *R. oxyacanthoides*
(b) Calyx lobes shorter than tube; fruit usually bristly — *R. setósum*
2. Stems smooth
a. Flowers yellow, 10-25 mm. long; fruit smooth, black, rarely yellow — *R. aúreum*
b. Flowers greenish to white or red
(1) Berries bristly
(a) Leaves smooth; fruit globose
x. Flower saucer-shaped; floral bracts tiny, 1-2 mm. long — *R. prostrátum*
y. Flower bell-shaped; bracts 4-6 mm. long — *R. wólfii*
(b) Leaves hairy, usually sticky; fruit ovoid; flower bell-shaped — *R. viscosíssimum*
(2) Berries smooth or nearly so
(a) Flower clusters hanging; calyx tubular
x. Calyx hairy; fruit red — *R. céreum*
y. Calyx smooth; fruit black — *R. flóridum*
(b) Flower clusters erect or ascending; calyx bell-shaped — *R. hudsoniánum*

Saxífraga Linné 1753 Saxifrage

(Lat. *saxum,* rock, *frango,* break from the habitat)

Pl. 30, fig. 2, 5, 7, 9, 10; Pl. 31, fig. 1-3.

Sepals 5, united, free from or grown to the base of the ovary, petals 5, white to yellow or red, usually alike, stamens 10, ovary superior or partly inferior, 2-celled, 2-lobed above, capsule 2-beaked, many-seeded; flowers solitary or in corymbs or panicles; leaves alternate or opposite, entire to pinnatifid; perennial.

1. Flowers white or whitish to purple
a. Flowers purple
(1) Leaves opposite, sessile, fleshy, ovate, entire; stems prostrate; flowers solitary — *S. oppositifólia*
(2) Leaves alternate, stalked, mostly basal, reniform, lobed; stems erect; flowers large, in an oblong cluster — *S. jámesi*
b. Flowers white to whitish, pinkish or yellowish
(1) Stems leafy

PLATE 31

SAXIFRAGES—MENTZELIAS

SAXIFRAGE FAMILY

1. Saxifraga nivalis: Saxifrage
2. Saxifraga debilis
3. Saxifraga caespitosa
4. Lithophragma parviflora
5. Mitella pentandra: Mitrewort
6. Heuchera halli
7. Heuchera parvifolia
8. Parnassia parviflora
9. Jamesia americana
10. Philadelphus microphyllus: Mock Orange
11. Fendlera rupicola
12. Ribes cereum: Currant
13. Ribes aureum

MENTZELIA FAMILY

14. Mentzelia nuda

EVENING PRIMROSE FAMILY

15. Anogra coronopifolia

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(a) Leaves usually wider than long, 3-7-lobed
x. Flower usually solitary, terminal, nodding; upper leaves with bulbils *S. cérnua*
y. Flowers 2-5, erect; bulbils absent *S. débilis*
(b) Leaves usually longer than wide, lobed to entire
x. Leaves entire, linear to oblong, ciliate, spiny-tipped, petals with orange or purple dots *S. bronchiális*
y. Leaves usually 3-5-toothed or cleft, mostly spatulate, not spiny-tipped; petals white, pinkish or yellowish, 2-7 mm. long *S. caespitősa*
(2) Stems leafless
(a) Stems 1-3 ft. high; leaves round, heart-shaped at base; flowers in a large open panicle *S. punctáta*
(b) Stems 1-15 in. high; leaves lanceolate to broadly ovate, tapering or rounded at base, entire to coarsely toothed; flowers 4-10 mm. wide, mostly in a head or a raceme of head-like clusters *S. nivális*

2. Flowers yellow
a. Flowers 8-15 mm. wide; basal leaves forming a dense rosette
(1) Stems 1-8 in. high, with runners at base; leaves ciliate, 10-15 cm. long *S. flagelláris*
(2) Stems 1-3 in. high, without runners; leaves smooth, 4-6 mm. long *S. chrysántha*
b. Flowers 1.5-2.5 cm. wide; stems without basal rosette, 6-12 in. high *S. hírculus*

Sullivántia Torrey and Gray 1842
(Named for Sullivant, an American botanist)

Sepals 5, united into a bell-shaped calyx grown to the base of the ovary, petals 5, white, stamens 5, ovary 2-celled, 2-beaked, styles 2; flowers in panicled cymes; leaves mostly basal, wavy-toothed or lobed; perennial.

Stems 4-12 in. high, sticky-hairy; leaves rounded, lobed and toothed, 2-5 cm. wide *S. hapemánni*

LYTHRALES LOOSESTRIFE ORDER

LYTHRÁCEAE LOOSESTRIFE FAMILY

Sepals 4-6, united into a cylindric, 8-12-ribbed calyx, petals 4-6, rarely none, pink to purple, stamens 8-12, inserted on the calyx-tube, ovary 2-celled, stigma globose, capsule enclosed in the calyx, opening by 2 valves or irregularly; flowers perfect, solitary to clustered; herbs or shrubs with opposite, alternate or whorled, entire leaves.

Lýthrum Linné 1753 Loosestrife

(Gr. *lythron*, blood, from the color)

Characters of the family.

Stems 1-4 ft. high; leaves lance-oblong, 1-3 cm. long; flowers 6-10 mm. wide — *L. alátum*

ONAGRÁCEAE EVENING PRIMROSE FAMILY

Sepals usually 4, rarely 2-6, united into a calyx grown to the ovary and often prolonged into a tube beyond it, petals usually 4, rarely 2-9 or none, separate, stamens usually 2, 4 or 8, ovary usually 4-celled, rarely 1-6-celled, stigma globose, disk-like or 4-lobed, ovules many, fruit a capsule or nut; flowers solitary or clustered, usually axillary; annual or perennial herbs, rarely shrubs, with alternate or opposite leaves.

1. Petals 4
   - a. Stigma 4-lobed
     - (1) Flowers white, pink or red
       - (a) Fruit 4-celled, many-seeded, splitting when ripe
         - x. Flowers red or rose-purple; seeds hairy
           - (x) Calyx-tube extending above the ovary; style straight — Zauschneria
           - (y) Calyx-tube not extending above the ovary; style recurved at first — Chamaenerium
         - y. Flowers white to pink
           - (x) Stamens equal in length — Anogra
           - (y) Stamens of two lengths
             - m. Leafy-stemmed; leaves 1-2 cm. long; flowers 2-2.5 cm. wide — Gaurella
             - n. Stemless or nearly so; leaves 3-10 in. long; flowers 2-6 in. wide — Pachylophus
       - (b) Fruit small, closed, 1-4-seeded; flowers 1-sided — Gaura

(2) Flowers yellow, at least at first
(a) Plant stemmed; leaves entire or toothed
x. Petals less than 1 cm. long; seeds hairy — EPILOBIUM
y. Petals 1-4 cm. long; seeds not hairy — ONAGRA
(b) Plants stemless; leaves pinnatifid — LAVAUXIA
b. Stigma entire or merely 4-toothed
(1) Stigma disk-like; flowers yellow
(a) Calyx-tube several times longer than the ovary — GALPINSIA
(b) Calyx-tube not longer than the ovary — MERIOLIX
(2) Stigma globose or club-shaped
(a) Calyx-tube not extending above the ovary; flowers white to rose — GAYOPHYTUM
(b) Calyx-tube extending above the ovary
x. Seeds hairy; flowers white to rose — EPILOBIUM
y. Seeds not hairy; flowers mostly yellow
(x) Calyx-tube longer than the ovary; capsule 4-winged; flowers yellow — TARAXIA
(y) Calyx-tube shorter than the ovary; capsule not winged
m. Capsule linear, sessile; flowers yellow, white or pink — SPHAEROSTIGMA
n. Capsule club-shaped, stalked; flowers yellow — CHYLISMA
2. Petals 2, white; fruit bristly-hairy — CIRCAEA

ANÓGRA Spach 1835 ANOGRA
(An anagram of Onagra)
Pl. 31, fig. 15.

Sepals 4, united into a long tube extending beyond the ovary, petals 4, white or pink, separate, stamens 8, equal, ovary 4-celled, linear, stigma 4-cleft, capsule oblong to linear, 4-angled, splitting; flowers solitary, axillary, opening in the daytime, buds drooping; leaves alternate, pinnatifid; annual or perennial.

1. Corolla 3.5-8 cm. wide; tips of the sepals united with each other in the bud; annual — *A. albicaúlis*
2. Corolla 2-3.5 cm. wide; the fine tips of the sepals free from each other in the bud; perennial
a. Leaves deeply pinnatifid; stems little woody, and bark not shredding; calyx-tube hairy inside — *A. coronopifólia*

b. Leaves wavy-toothed or entire, rarely pinnatifid; stems woody, bark shredding; calyx-tube smooth inside *A. pállida*

CHAMAENÉRIUM Adanson 1763 FIREWEED
(Gr. *chamae*, on the ground, *nerion*, rose-bay)
Pl. 32, fig. 1.

Sepals 4, united into a tube, not extending beyond the ovary, the 4 lobes falling off, petals 4, red-purple, somewhat irregular in form or position, stamens 8, ovary 4-celled, stigma 4-cleft, capsule 4-celled, 4-angled, elongated; flowers in terminal racemes; leaves alternate, entire or wavy; perennial.

1. Stems 1-5 ft. high; leaves lanceolate, short-petioled, 2-8 in. long; bracts small; style hairy at base *C. angustifólium*
2. Stems .5-1.5 ft. high; leaves mostly sessile, lance-ovate, 1-2 in. long; bracts leaf-like; style smooth *C. latifólium*

CHYLÍSMA Nuttall 1840
(Gr. *chylisma*, the juice of plants)

Sepals 4, united into a funnel-form or obconic calyx, petals 4, yellow, stamens 8, unequal, stigma globose, capsule linear to club-shaped; flowers in terminal racemes; leaves simple or pinnate; annual.

Flower stem 6-15 in. high; leaves ovoid, entire; flowers 4-5 mm. long *C. scapoídea*

CIRCAEA Linné 1753 ENCHANTER'S NIGHTSHADE
(Named for the enchantress Circe)

Sepals 2, united into a hairy tube extending but slightly beyond the ovary, petals 2, white, stamens 2, alternating with the petals, ovary 1-2-celled, ovules 1 in each cavity, stigma globoid, fruit obovoid, not splitting, covered with hooked bristly hairs; flowers in terminal and lateral racemes; leaves opposite, simple, toothed; perennial.

1. Stems 4-8 in. high; leaves coarsely toothed and heart-shaped at base *C. alpína*
2. Stems 1-2 ft. high; leaves finely wavy-toothed, round or truncate at base *C. pacífica*

EPILÓBIUM Linné 1753 WILLOW HERB
(Gr. *epi*, upon, *lobion*, little pod, from the corolla)

Sepals 4, united into a calyx-tube extending beyond the ovary, petals 4, white to pink or rose-purple, separate, stamens 8, ovary 4-celled, ovules

numerous, stigma 4-lobed or club-shaped, capsule cylindric, opening by 4 valves; flowers axillary or terminal, solitary or clustered; leaves alternate or opposite, entire to toothed; annual or perennial.

1. Flowers yellowish or cream-colored; stigma 4-lobed; stems woody at base — *E. suffruticósum*
2. Flowers white, pink, red or purplish; stigma entire or nearly so
   a. Annual, usually much branched; leaves linear to lance-linear; petals 6-10 mm. long, rose to lilac; pods club-shaped, 2-3 cm. long — *E. paniculátum*
   b. Perennial by rosettes, stolons or underground stems
      (1) Leaves linear to lance-linear, closely gray-hairy; flowers pink or white, 4-8 mm. wide — *E. lineáre*
      (2) Leaves lanceolate to ovate, not gray-hairy
         (a) Plants with rosettes or scaly shoots; seeds warted under the microscope — *E. adenocaúlum*
         (b) Plants with stolons or underground stems; seeds smooth under the microscope — *E. alpínum*

Galpínsia Britton 1894
(An anagram of Salpingia)

Sepals 4, united into a long funnel-form tube extending beyond the ovary, petals 4, yellow, stamens 8, equal, ovary 4-celled, elongated, stigma disk-like, capsule elongated; flowers solitary, axillary; leaves alternate, simple, entire or toothed; perennial.

Stems spreading, 4-6 in. high; leaves linear-oblong to lanceolate, entire or toothed, 1-5 cm. long; flowers 2-5 cm. wide — *G. hartwégi*

Gaúra Linné 1753 Gaura
(Gr. *gauros*, proud)
Pl. 32, fig. 2.

Sepals 4, united into a narrow tube extending beyond the ovary, the lobes reflexed, petals 4, white to pink or red, clawed, unequal, stamens 8, ovary 1-celled, stigma 4-lobed, fruit nut-like, not splitting, 1-4-seeded; flowers irregular, in terminal racemes or spikes; leaves alternate, simple, sessile; annual, biennial or perennial.

1. Flowers 3-4 mm. wide; fruit 8-ribbed; stems 3-10 ft. high — *G. parviflóra*

2. Flowers 1-2 cm. wide; fruit 4-angled
   a. Stems .5-2 ft. high; flowers more or less red *G. coccínea*
   b. Stems 2-5 ft. high; flowers white to pink *G. biénnis*

GAURÉLLA Small 1896
(Diminutive of Gaura)

Sepals 4, united into a cylindric tube, purplish, petals 4, white or pink, stamens 8, the alternate ones longer, ovary 4-angled, stigmas linear, capsule ovoid-pyramidal, beaked, 4-angled; flowers solitary, axillary; leaves alternate, simple; perennial.

Stems spreading, 4-8 in. high, grayish; leaves lance-linear, entire or toothed, 1-2 cm. long; flowers 2-2.5 cm. wide *G. canéscens*

GAYÓPHYTUM Jussieu 1832
(From Gay, a botanical traveller, and Gr. *phyton*, plant)

Sepals 4, united into a tube, not prolonged beyond the ovary, lobes reflexed, petals 4, white or rose, stamens 8, alike or sometimes in 2 sets, stigma globose to club-shaped, capsule linear to club-shaped; flowers solitary, axillary; leaves alternate, entire, linear; annual.

1. Pods on stalks 1-2 mm. long *G. caésium*
2. Pods on stalks usually 5-15 mm. long
   a. Flowers 5-10 mm. wide; stigma club-shaped *G. diffúsum*
   b. Flowers 2-4 mm. wide; stigma globose *G. ramosíssimum*

LAVÁUXIA Spach 1835
(Named for Delavaux, a French botanist)

Sepals 4, united into a tube several times longer than the ovary, petals 4, white, pink or yellow, separate, stamens 8, the alternate longer, ovary 4-celled, 4-winged, stigma 4-cleft; flowers solitary; leaves basal, pinnatifid; stemless perennial or annual.

1. Flowers 1-2 in. wide, yellow then pink; fruits beaked *L. trilóba*
2. Flowers 3-4 in. wide, yellow; fruits not beaked *L. brachycárpa*

MERÍOLIX Rafinesque 1818
(Of doubtful origin and meaning)
Pl. 32, fig. 3.

Sepals 4, united into a tube shorter than the ovary, petals 4, separate, yellow, stamens 8, ovary 4-celled, 4-angled, stigma disk-like, 4-toothed, pods linear, 4-angled; flowers axillary, solitary, regular; leaves alternate, entire or toothed; biennial or perennial.

PLATE 32

EVENING PRIMROSES—CACTI

EVENING PRIMROSE FAMILY

1. Chamaenerium angustifolium: Fireweed
2. Gaura coccinea
3. Meriolix serrulata
4. Onagra biennis: Evening Primrose

MENTZELIA FAMILY

5. Mentzelia multiflora

CACTUS FAMILY

6. Opuntia humifusa: Prickly Pear
7. Cactus viviparus

ROCKY MOUNTAIN FLOWERS

PLATE 32.

Stems 6-15 in. high; leaves linear-oblong or lanceolate, toothed, 1-3 in. long; flowers 1-2.5 cm. wide — *M. serrulata*

ONÁGRA Adanson 1763 EVENING PRIMROSE
(Gr. *onagra*, wild ass, from a fancied resemblance of its leaves to an ass's ears)
Pl. 32, fig. 4.

Sepals 4, united into a tube longer than the ovary, petals 4, yellow, white or pink, separate, stamens 8, ovary 4-celled, stigma 4-cleft, capsule 4-angled; flowers in terminal spikes, opening in the evening; leaves alternate, entire to toothed; annual or biennial.

1. Calyx tube 1-2 in. long
   a. Petals yellow, 1-2 cm. long — *O. biénnis*
   b. Petals yellow or pinkish, 2-4 cm. long — *O. Hoókeri*
2. Calyx tube 2-4 in. long — *O. jámesi*

PACHÝLOPHUS Spach 1835 EVENING PRIMROSE
(Gr. *pachys*, thick, *lophos*, crest, from the pod)

Sepals 4, united into a tube several times longer than the ovary, petals 4, white or pink, separate, stamens 8, the alternate longer, stigma 4-cleft, ovary short, capsule pyramidal; flowers solitary; leaves basal, entire to pinnatifid; mostly stemless perennials.

Plants stemless or rarely with a short stem; leaves smooth to densely hairy, entire to pinnatifid; flowers 2-6 in. wide; calyx-tube 2-8 in. long — *P. caespitósus*

SPHAEROSTÍGMA Seringe 1828
(Gr. *sphaira*, ball, *stigma*, spot)

Sepals 4, united into a short tube, petals 4, yellow, white or rose, separate, stamens 8, ovary 4-celled, stigma globose, capsule 4-angled; flowers axillary and solitary or in terminal spikes; leaves alternate, entire or toothed; annual or perennial.

1. Flowers yellow, often turning red — *S. contórtum*
2. Flowers white or rose — *S. minutiflórum*

TARÁXIA Nuttall 1840
(From its resemblance to Taraxacum)

Sepals 4, united into a tube longer than the ovary, petals 4, yellow or white, separate, stamens 8, ovary 4-celled, stigma globose, pod 4-grooved or angled; flowers axillary; leaves basal, pinnatifid or entire; stemless perennial.

1. Leaves entire or wavy, smooth — *T. subacaúlis*
2. Leaves pinnatifid, finely hairy — *T. breviflóra*

Zauschnéria Presl 1831
(Named for Zauschner, a German botanist)

Sepals 4, united into a tube extending beyond the ovary, bearing 8 small scales inside at the upper end, petals 4, red, stamens 8, 4 longer, ovary 4-celled, stigma 4-lobed, capsule linear, 4-angled; flowers large, in racemes; leaves mostly opposite, simple, toothed; perennial, or woody at base.

Stems .5-1 ft. high; leaves ovate, 1 in. long; calyx-tube 12-15 mm. long — *Z. califórnica*

GUNNERÁCEAE WATER MILFOIL FAMILY

Sepals 2-4, united into a calyx grown to the ovary, petals 2-4 or none, stamens 1-8, ovary 1-4-celled, styles 1-4, fruit a nutlet or drupe of 2-4 1-seeded carpels; flowers perfect, monoecious or dioecious, solitary or clustered; perennial or annual aquatic herbs with alternate or whorled leaves, the submerged ones usually dissected.

1. Leaves entire, 6-12 in a circle — Hippuris
2. Leaves finely cut, 3-5 in a circle — Myriophyllum

Hippúris Linne 1753 Bottle Brush
(Gr. *hippos,* horse, *oura,* tail)

Sepals united into an entire calyx, petals 0, stamen 1 on the margin of the calyx, ovary 1-celled, style 1, fruit a 1-celled, 1-seeded drupe; flowers axillary, perfect or imperfect; leaves simple, entire, whorled; aquatic perennial.

Stems .5-2 ft. high; leaves linear or lanceolate, 1-3 cm. long — *H. vulgáris*

Myriophýllum Linné 1753 Water Milfoil
(Gr. *myrios,* countless, *phyllon,* leaf)

Sepals usually 2-4, united into a short tube, petals 2-4, greenish, stamens 4-8, ovary 2-4-celled with 1 ovule in each cell, styles 4, fruit maturing into 4 1-seeded closed carpels; flowers monoecious or perfect, axillary or becoming spiked; leaves whorled or alternate, the aerial ones entire to cleft, submerged ones finely dissected; aquatic perennial.

1. Flowers in a spike, the bracts small, ovate — *M. spicátum*
2. Flowers in the axils of pinnatifid leaves — *M. verticillátum*

CACTALES CACTUS ORDER

CACTÁCEAE CACTUS FAMILY

Sepals many, united or separate, grown to the ovary, petals many, in several rows, mostly separate, stamens many, inserted on the throat of the calyx, ovary 1-celled, fruit a berry, mostly fleshy but sometimes nearly dry; flowers usually solitary, sessile, terminal or lateral; fleshy plants with continuous or jointed stems, the latter often ridged or tubercled; leafless or nearly so, with spines arising from cushions of minute bristles.

1. Stems jointed, the joints flat or cylindric — OPUNTIA
2. Stems not jointed, but with ridges or nipples
   a. Stems with ribs or ridges
      (1) Flowers greenish to red or purple — ECHINOCEREUS
      (2) Flowers yellow — ECHINOCACTUS
   b. Stems with nipple-like projections
      (1) Flowers and fruits arising between the nipples — CACTUS
      (2) Flowers arising from the nipples — ECHINOCACTUS

CÁCTUS Linné 1753 NIPPLE CACTUS

(Gr. name of a prickly plant)

Pl. 32, fig. 7.

Sepals many, united into a bell-shaped or funnel-form calyx, grown to the ovary, petals in several rows, yellowish-green to purple, ovary smooth, berry ovoid or club-shaped; flowers borne at the bases of the tubercles; leaves none; stems solitary or clustered, globose or ovoid, with tubercles or nipples; tubercles conic or cylindric, woolly and with clusters of spines at the apex.

1. Central spine one or none in each cluster; flowers yellowish-green; plants single or clustered — *C. missouriénsis*
2. Central spine 3-12 in each cluster; flowers purple — *C. vivíparus*

ECHINOCÁCTUS Link and Otto 1827

(Gr. *echinos,* hedgehog, *kaktos,* cactus)

Sepals many, united into a tube grown to the ovary, petals numerous, rose, purple to yellow, berry usually covered with scales and tufts of bristles; flowers borne on tubercles at or near points from which the spines are developed; stems globose, oblong or cylindric, leafless, tubercled; tubercles arranged in straight or spiral rows, often forming ridges.

1. Stems with nipples
   a. Central spines 8-10; radial spines 20-30; flowers greenish-yellow to purple — *E. simpsoni*
   b. Central spines 1-3; radial spines 8-9; flowers rose — *E. glaucus*
2. Stems with ribs or ridges; central spines 4; radial spines 9-11; flowers yellow — *E. whipplei*

Echinocéreus Engelmann 1848

(Gr. *echinos,* hedgehog, *Cereus,* a genus of cacti)

Sepals many, united into a tube grown to the ovary, petals many, purple, red to yellowish-green, fruit spiny; flowers borne on the ribs or tubercles, close to fully developed clusters of spines; stems ovoid, cylindric or oval, ribbed, the ribs somewhat tubercled.

1. Ribs usually 13; flowers greenish-yellow — *E. viridiflórus*
2. Ribs 5-12; flowers red to purple
   a. Ribs 5-7; flowers red
      (1) Radial spines 3-5, nearly round; central spine absent — *E. paucispínus*
      (2) Radial spines 6-8, angled; central spine 3-8 cm. long — *E. gonacánthus*
   b. Ribs 8-12
      (1) Central spine 1, black; radial spines usually 7; flowers violet-purple — *E. féndleri*
      (2) Central spines 1-3, white or yellowish; radial spines 8-12; flowers red — *E. aggregátus*

Opúntia Miller 1759 Prickly Pear

(Gr. name of a plant)

Pl. 32, fig. 6.

Sepals many, united into a tube grown to the ovary, petals many, yellow, red or purple, slightly united at base, stamens very numerous in several rows, berry pear-shaped, smooth or spiny; flowers usually somewhat lateral; stems jointed, branching, the joints flat or cylindric with small, awl-shaped, deciduous leaves, the areoles axillary, usually spine-bearing.

1. Joints of the stem flat, oval to round
   a. Fruits fleshy, smooth or nearly so; flowers yellow
      (1) Spines none or a single large reflexed one and 1-2 small ones — *O. humifúsa*

(2) Spines 1-8, not greatly unlike in length
(a) Spines twisted, 3-5 *O. tortispína*
(b) Spines not twisted, 1-8
x. Spines 1-3, brownish; joints round to obovate *O. camánchica*
y. Spines 5-7; joints oblong *O. schweriniána*
b. Fruit dry, usually spiny; flowers yellow or red
(1) Flowers yellow, spines 8-15 *O. polyacántha*
(2) Flowers red; spines 2-4 *O. rhodántha*
2. Joints of the stem flattish to somewhat terete, separating easily
a. Flowers yellowish; joints 1-2 in. long; spines usually 4 *O. frágilis*
b. Flowers pink or reddish; joints 2-4 in. long; spines 3-5 *O. rútila*
3. Joints long, cylindric or angled; stems 2-15 ft. high
a. Plants spreading, about 2 ft. high; edges of stem not comb-like *O. dávisi*
b. Plants erect, 4-15 ft. high; edges of the stem comb-like *O. arboréscens*

LOASALES MENTZELIA ORDER

LOASACEAE MENTZELIA FAMILY

Sepals 4-5, united into a long tube, grown to the ovary, petals 4-10 on the throat of the calyx, stamens many, inserted with the petals, ovary 1-celled, style entire or 2-3-lobed; flowers solitary or in racemes or cymes, regular, perfect; herbs with opposite or alternate leaves, usually armed with hooked hairs.

MENTZÉLIA Linné 1753 MENTZELIA

(Named for Mentzel, a German botanist)
(Touterea E. & W.; Acrolasia Rydberg)
Pl. 31, fig. 14; pl. 32, fig. 5.

Sepals 5, united into a cylindric or club-shaped calyx, grown to the ovary, petals 5-10, cream-colored to yellow, stamens 20-many, ovary 1-celled, styles 3, somewhat united, capsule opening at the top, seeds often winged; flowers terminal, solitary or in cymes; leaves alternate, entire to pinnatifid; annual or perennial.

1. Flowers 1-2 cm. wide; petals 5, yellow
   a. Leaves sessile, ovate to lance-linear, entire to sometimes pinnatifid — *M. albicaúlis*
   b. Leaves with a distinct short petiole, ovate to oblong, toothed or angled — *M. oligospérma*
2. Flowers 1-5 in. wide; petals usually 10, cream-colored or yellow
   a. Flowers cream-colored, opening at evening and closing in the morning
      (1) Flowers 1.5-2.5 in. wide — *M. núda*
      (2) Flowers 3-5 in. wide — *M. ornáta*
   b. Flowers yellow or golden
      (1) Flowers 1-2 in. wide, usually opening in the evening — *M. multiflóra*
      (2) Flowers 2.5-5 in. wide, day-blooming — *M. levicaúlis*

CUCURBITACEAE GOURD FAMILY

Sepals usually 5, united and grown to the ovary, petals usually 5, separate or united, stamens usually 3, ovary 1-3-celled, style simple or lobed, fruit a pepo, splitting or non-splitting; flowers solitary or in racemes, monoecious or dioecious; climbing or trailing herbaceous vines with alternate usually lobed leaves.

1. Flowers solitary, yellow; trailing vine — CUCURBITA
2. Flowers in a raceme, greenish-white; climbing or clambering — MICRAMPELIS

CUCÚRBITA Linné 1753 WILD PUMPKIN

(The Latin name of the gourd)

Sepals 5, united into a bell-shaped calyx, petals 5, yellow, united, stamen flower with 3 stamens, pistil flower with a 1-celled ovary, stigmas 3-5, sterile stamens 3, fruit a pepo with a thick rind; flowers single, axillary, monoecious; leaves usually lobed, toothed; stems prostrate; tendril-bearing.

Stems 5-20 ft. long; leaves 4-12 in. long; flowers 2-4 in. long — *C. foetidíssima*

MICRÁMPELIS Rafinesque 1808 WILD CUCUMBER

(Gr. *mikros,* small, *ampelis,* vine)

(Echinocystis T. & G.)

Sepals 5-6, united into a bell-shaped calyx, petals 5-6, white, united, stamen flower with 3 stamens, pistil flower with a 2-celled ovary, fruit more or less bladdery, 1-2-celled, densely spiny; flowers in racemes, monoecious; leaves digitately 3-7-lobed; annual climber with tendrils.

Stems 10-25 ft. high; leaves 2-5 in. long; fruit flat elliptic, 1.5-2 in. long — *M. lobáta*

CELASTRALES BITTERSWEET ORDER

CELASTRÁCEAE BITTERSWEET FAMILY

Sepals 4-5, united, petals 4-5, separate, stamens 4-5, inserted on the disk, alternate with the petals, ovary 2-5-celled, stigma entire or 3-5-lobed, fruit a fleshy or dry 2-5-celled pod, splitting when ripe; flowers regular, usually purplish, solitary or in terminal or axillary clusters; trees or shrubs, sometimes climbing, with alternate or opposite simple leaves.

1. Flowers 5-parted; erect shrubs, often with spiny branches — FORSELLESIA
2. Flowers 4-parted; spreading or trailing overgreen shrubs without spines — PACHYSTIGMA

FORSELLÉSIA Greene 1893

(Named for Forselles, a Swedish botanist)

Pl. 33, fig. 2.

Sepals 5, united, petals 5, white, separate, long-linear, stamens 5-10, ovary 1-celled, with 2 ovules, fruit dry, ovoid, pointed; flowers solitary, axillary; leaves alternate, simple; low shrub, often spiny.

Stems 1-2 ft. high; leaves oblong to spatulate, 1-2 cm. long; petals about 1 cm. long — *F. spinéscens*

PACHYSTÍGMA Rafinesque 1818

(Gr. *pachys,* thick, *stigma,* stigma; incorrectly Pachystima)

Pl. 33, fig. 1.

Sepals 4, united, petals 4, brownish, separate, stamens 4, ovary 2-celled, immersed in the disk, stigma 2-lobed, capsule 2-celled, 1-2-seeded, splitting; flowers axillary, solitary or clustered; leaves opposite, simple, leathery, evergreen; low shrub.

Stems .5-3 ft. high; leaves oblong to oblanceolate, 1-3 in. long — *P. myrsinítes*

VITÁCEAE GRAPE FAMILY

Sepals 4-5, united into an entire or toothed calyx, petals 4-5, separate or cohering, falling early, stamens 4-5, ovary 1, usually immersed in the disk, 2-6-celled, fruit mostly a 2-celled berry; flowers greenish, perfect, polygamous or dioecious, in racemes, cymes or panicles; climbing shrubs with tendrils and alternate, lobed or compound leaves.

1. Leaves simple, lobed — VITIS
2. Leaves usually of 5 leaflets — PARTHENOCISSUS

Vítis Linné 1753 Grape

(The Latin name)

Sepals 4-5, united into a calyx, petals greenish, coherent and falling without expanding, stamens 4-5, ovary mostly 2-celled, berry globose or ovoid, few-seeded; flowers mostly dioecious or polygamous, in racemes or panicles; leaves simple, usually digitately lobed; climbing or trailing woody vines with tendrils.

Leaves 3-7-lobed, 4-6 in. long; berry 8-12 mm. wide *V. vulpina*

Parthenocíssus Planchon 1887 Virginia Creeper, American Ivy

(Gr. *parthenos,* maiden, *kissos,* ivy)

Pl. 33, fig. 7.

Sepals 5, united into a calyx, petals 5, greenish, stamens 5, ovary 2-celled, berry 1-4-seeded, not edible; flowers perfect or polygamous-monoecious, in compound cymes or panicles; leaves digitate, leaflets 5-7; climbing or trailing woody vines, the tendrils coiling, or with adhering disks.

Leaflets lance-oblong to ovate. 2-6 in. long; berry 10-12 mm. wide *P. quinquefólia*

RHAMNACEAE BUCKTHORN FAMILY

Sepals 4-5, united into a tube, petals 4-5, or none, stamens 4-5, inserted with the petals on the calyx, ovary 2-5-celled, free or immersed in the disk, fruit a drupe or capsule, often 3-celled; flowers in axillary or terminal cymes or panicles, perfect or polygamous; trees or shrubs, often thorny, with alternate simple leaves.

1. Fruit fleshy, berry-like; petals with a short claw or wanting Rhamnus
2. Fruit dry, 3-lobed, becoming 3 nutlets; petals with a long claw Ceanothus

Ceanóthus Linné 1753 Redroot

(Greek name of a plant)

Pl. 33, fig. 4-6.

Sepals 5, united into a hemispheric or top-shaped calyx, petals 5, white to pink, hood-like, clawed, stamens 5, ovary immersed in the disk and grown to it at the base, 3-lobed, style 3-cleft, fruit dry, 3-lobed, separating into 3 nutlets when ripe; flowers in terminal or axillary cyme-like panicles; leaves alternate, simple; shrubs.

1. Leaves large, 1-4 in. long; stems not spiny
   a. Leaves leathery, shining, roundish to ovate, 2-4 in. long *C. velutínus*
   b. Leaves thin, soft-hairy, ellipsoid, 1-2 in. long *C. ovátus*
2. Leaves small, 1-2.5 cm. long; stems usually spiny *C. féndleri*

Rhámnus Linné 1753 Buckthorn

(The Greek name)
Pl. 33, fig. 3.

Sepals 4-5, united into a bell-shaped calyx, petals 4-5, or none, greenish, ovary free from the disk, styles 3-4-cleft, drupe berry-like; flowers axillary, in cymes, racemes or panicles, perfect or polygamous; leaves alternate, simple; shrubs or small trees.

1. Leaves ovate to elliptic, 5-10 cm. long; stamens 5; petals absent *R. alnifólia*
2. Leaves lanceolate, 3-5 cm. long; stamens 4; petals present *R. smíthi*

ELAEAGNÁCEAE SILVERBERRY FAMILY

Sepals 4, united into a saucer-shaped to tubular calyx, petals none, stamens 4 or 8, ovary 1-celled, 1-seeded, fruit drupe-like, the base of the perianth enclosing the achene or nut; flowers polygamous or dioecious, clustered in the axils, rarely solitary; shrubs or trees with silvery-scaly or stellate-hairy entire, alternate or opposite leaves.

1. Leaves alternate; flowers perfect; stamens 4 Elaeagnus
2. Leaves opposite; flowers dioecious; stamens 8 Lepargyraea

Elaeágnus Linné 1753 Silverberry

(Gr. *elaia,* olive-tree, *agnos,* sacred)
Pl. 33, fig. 10.

Sepals 4, united into a tubular calyx, constricted above the ovary, petals none, stamens 4 on the throat of the perianth, style long, thread-like, fruit drupe-like, the fleshy or mealy base of the perianth enclosing the nut; flowers solitary or 2-4 together in the axils, silvery outside, yellowish within; leaves alternate, entire, silvery-scaly; shrubs.

Stems 3-12 ft. high; leaves oblong to lance-ovate, 1-4 in. long *E. argéntea*

PLATE 33

BITTERSWEET FAMILY

1. Pachystigma myrsinites
2. Forsellesia spinescens

BUCKTHORN FAMILY

3. Rhamnus smithi: Buckthorn
4. Ceanothus velutinus: Redroot
5. Ceanothus ovatus
6. Ceanothus fendleri

GRAPE FAMILY

7. Parthenocissus quinquefolia: Virginia Creeper

SILVERBERRY FAMILY

8. Lepargyraea argentea: Buffalo Berry
9. Lepargyraea canadensis
10. Elaeagnus argentea: Silverberry

SANDALWOOD FAMILY

11. Comandra pallida: Toad Flax

MISTLETOE FAMILY

12. Phoradendrum juniperinum: Mistletoe
13. Razumovskya cryptopoda

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LEPARGYRAÉA Rafinesque 1817 BUFFALO BERRY

(Gr. *lepos*, scale, *argyraios*, silvery)
(Shepherdia Nuttall)
Pl. 33, fig. 8-9.

Sepals 4, united into an urn-shaped calyx, petals none, the pistillate flower with an 8-lobed disk nearly closing the mouth, style somewhat exserted, stamens 8, fruit drupe-like, the fleshy perianth base enclosing the nut; flowers axillary, clustered, dioecious or polygamous; pistillate flowers solitary to few; leaves opposite, entire, brown or silvery-scurfy; shrubs.

1. Stems usualy thorny, 6-20 ft. high; leaves oblong, silvery above and below, 1-2 in. long *L. argéntea*
2. Stems not thorny, 3-8 ft. high; leaves ovoid, silvery below only, 1-1.5 in. long *L. canadénsis*

SANTALACEAE SANDALWOOD FAMILY

Sepals 4-5, grown to the ovary, petals none, stamens 5, anthers connected by a tuft of hairs to the sepals, ovary 1-celled, ovules 2-4, style 1, fruit drupe-like or nut-like, 1-seeded, crowned by the persistent calyx-lobes; flowers greenish-white, perfect, in terminal, umbel-like clusters; perennial herbs, sometimes parasitic, with alternate, sessile leaves.

COMÁNDRA Nuttall 1818 TOAD FLAX

(Gr. *kome*, hair, *aner, andros*, man)
Pl. 33, fig. 11.

Characters of the family.

Stems 4-10 in. high; leaves linear to lance-oblong; flowers small, white *C. pállida*

LORANTHACEAE MISTLETOE FAMILY

Sepals 2-4, petals none, stamens 2-4, ovary inferior, 1-celled, fruit a 1-seeded berry; flowers dioecious, in spikes or panicles; evergreen parasites on trees or shrubs, yellowish-green to brownish, branches 2-forking with swollen joints; leaves reduced to opposite leathery scales.

1. Parasitic on juniper and cedar; berry globose, translucent PHORADENDRUM
2. Parasitic on pines and spruces; berry compressed, opaque RAZUMOVSKYA

PHORADÉNDRUM Nuttall 1849 MISTLETOE
(Gr. *phora,* borne, *dendron,* wood, from its habit)
Pl. 33, fig. 12.

Sepals usually 3, united into a globular calyx, grown to the ovary, petals none, stamens 3, berry 1-seeded; flowers greenish, dioecious, in axillary spikes; leaves reduced to triangular scales; parasites.

Stems round or square, 4-12 in. high; berry whitish or reddish — *P. juniperínum*

RAZUMÓVSKYA Hoffmann 1808
(Named for Count Razumovski)
Pl. 33, fig. 13.

Sepals 3 in the stamen flower, 2 in the pistil flower, petals none, stamens usually 3, berry 1-seeded; flowers greenish, dioecious, solitary, in apparent spikes or panicles; leaves reduced to united scales; parasites.

1. Parasitic on pines
   - a. On lodgepole pine — *R. americána*
   - b. On limber pine — *R. cyanocárpa*
   - c. On pinyon — *R. divaricáta*
   - d. On yellow pine — *R. cryptópoda*
2. Parasitic on Douglas fir — *R. douglasi*

SAPINDALES MAPLE ORDER

ACERÁCEAE MAPLE FAMILY

Sepals 5, united, petals 5, or none, stamens 4-12, ovary 2-lobed, 2-celled, styles 2, fruit of 2 winged, 1-seeded samaras; flowers polygamous or dioecious, in axillary or terminal racemes or cymes; trees or shrubs with opposite simple and lobed or odd-pinnate leaves.

ACER Linné 1753 MAPLE, BOXELDER
(Lat. *acer,* maple-tree)
Pl. 34, fig. 1, 2.

Characters of the family.

1. Leaves of 3-5 ovate toothed or lobed leaflets; flowers dioecious — *A. negúndo*
2. Leaves simple, 3-lobed or parted, or some cut into 3 leaflets; flowers polygamous
   - a. Wings of fruit broad; flower cluster stalked — *A. glábrum*

PLATE 34

MAPLES—OAKS

MAPLE FAMILY

1. Acer glabrum: Mountain Maple
2. Acer negundo: Boxelder

SUMAC FAMILY

3. Rhus rydbergi: Poison Ivy
4. Rhus glabra: Sumac
5. Rhus trilobata

BIRCH FAMILY

6. Betula glandulosa: Alpine Birch
7. Betula fontinalis: Birch
8. Alnus tenuifolia: Alder
9. Corylus rostrata: Hazelnut

BEECH FAMILY

10. Quercus gunnisoni: Oak
11. Quercus gambeli
12. Quercus undulata

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b. Wings of fruit narrow; flower cluster nearly sessile *A. grandidentátum*

ANACARDIACEAE SUMAC FAMILY

Sepals 4-6, united, petals 4-6, rarely none, stamens 5, ovary usually 1-celled, styles 3, fruit usually a drupe; flowers polygamous, in axillary or terminal panicles; trees or shrubs with alternate, 3-foliate, odd-pinnate leaves.

Rhús Linné 1753 Sumac, Poison Ivy

(Gr. *rhous,* sumac, perhaps from the Celtic for red)

Pl. 34, fig. 3-5.

Characters of the family.

1. Leaflets 3
   a. Leaflets 1-4 in. long, broadly ovate, toothed; stems little branched, 3 in.-2 ft. high; poisonous to the touch *R. rydbérgi*
   b. Leaflets .5-1 in. long, wedge-shaped to obovate, usually lobed; stems bushy, 1-8 ft. high *R. trilobáta*
2. Leaflets 11-31, lanceolate, 2-6 in. long; stems 3 12 ft. high *R. glábra*

BETULÁCEAE BIRCH FAMILY

Sepals 2-4, united, or none, petals 0, stamens 2-10, ovary 1-2-celled, fruit a 1-seeded nut, sometimes with an involucre; flowers monoecious in catkins; trees or shrubs with alternate, simple often lobed, toothed leaves.

1. Fruits in spikes or catkins
   a. Bracts of the fruiting catkin papery, 3-lobed, falling with the small nut Betula
   b. Bracts of the fruiting catkin thick, not 3-lobed, persistent Alnus
2. Fruit a large nut in a tubular involucre, paired Corylus

Álnus Linné 1753 Alder

(Lat. *alnus,* alder)

Pl. 34, fig. 8.

Sepals of the stamen flower 3-5, united, of the pistil flower none, petals 0, stamens 2-5, stamen catkins with 4-5 bractlets and 3 or 6 flowers upon each stalked, shield-shaped scale, pistil catkins with 2 flowers in the axil of

each bract, with 2-4 bractlets, woody in fruit; leaves alternate, doubly toothed; trees or shrubs.

Trunks 10-30 ft. high; leaves ovate-oblong, 2-4 in. long; catkins 8-12 mm. long — *A. tenuifólia*

BÉTULA Linné 1753 BIRCH
(Lat. *betula*, birch-tree)
Pl. 34, fig. 6-7.

Sepals of the stamen flowers 4, united, of the pistil flowers none, stamens 2; stamen-flowers usually 3 in the axil of each bract, with 2 bractlets, pistil flowers usually 2-3 in the axil of 3-lobed or entire bracts; fruit a winged nut; leaves alternate, toothed or lobed; shrubs or trees.

1. Bark white or gray; trees — *B. papyrífera*
2. Bark dark brown or greenish brown; shrubs
   a. Stems 5-20 ft. high; leaves ovate, 3-6 cm. long; catkins 2-3 cm. long — *B. fontinális*
   b. Stems 1-8 ft. high; leaves cuneate to obovate, 1-2.5 cm. long; catkins 1-2 cm. long — *B. glandulósa*

CÓRYLUS Linné 1753 HAZEL-NUT
(Gr. *korys*, helmet, probably from the involucre)
Pl. 34, fig. 9.

Sepals of the stamen flowers none, of the pistil flowers 4-5, petals none, stamens 4; stamen flowers solitary in the axil of each bract, with 2 bractlets, pistil flowers solitary in the axil of a bract, with 2 bractlets enlarging in fruit and forming a leaf-like involucre about the nut; leaves alternate, toothed; shrubs.

Stems 1-6 ft. high; leaves ovate, 2.5-4 in. long; nut ovoid, 1-1.5 mm. high — *C. rostráta*

FAGACEAE BEECH FAMILY

Sepals 4-8, united, petals none, stamens 4-20, ovary 3-7-celled, fruit a 1-seeded nut; flowers monoecious, staminate in catkins, pistillate solitary or clustered; leaves alternate, simple, entire to lobed; trees or shrubs.

QUÉRCUS Linné 1753 OAK
(Lat. *quercus*, oak)
Pl. 34, fig. 10-12.

Sepals of the stamen flowers usually 6, united, of the pistil flowers completely united into a tube, petals none, stamens 6-12, ovary 3-celled,

fruit an involucre with many bracts, forming a cup at the base or nearly enclosing the 1-seeded nut or acorn; flowers greenish, staminate many in drooping catkins, pistillate solitary; leaves entire to pinnatifid, sometimes evergreen; trees or shrubs.

1. Scales of the acorn cup with long spreading tips; usually trees — *Q. macrocárpa*
2. Scales not long and spreading; usually shrubs
   a. Leaves deciduous, deeply round-lobed, smooth to hairy
      (1) Acorns keg-shaped, about ⅓ covered by the cup — *Q. gunnisóni*
      (2) Acorns ovoid, about ½ covered by the cup — *Q. gambéli*
   b. Leaves evergreen or somewhat so, sinuately toothed, the teeth sharp-pointed or spiny — *Q. undulàta*

APIALES PARSLEY ORDER

ARALIÁCEAE GINSENG FAMILY

Sepals usually 5, united into a tube grown to the ovary, petals usually 5, white or greenish, separate, stamens 5, alternate with the petals, ovary 5-celled, styles 5, fruit a berry; flowers mostly perfect, in umbels; perennial herbs with alternate leaves divided into three 3-5-pinnate parts.

ARÁLIA Linné 1753 ARALIA, WILD SARSAPARILLA
(Of uncertain origin and meaning)
Pl. 35, fig. 1.

Characters of the family.

Stems short or none; leaflets 3-5, 2-5 in. long; umbels usually 3 — *A. nudicaúlis*

CORNÁCEAE DOGWOOD FAMILY

Sepals 4, united into a calyx grown to the ovary, petals 4, white, greenish or purple, rarely wanting, stamens usually 4. ovary 2-celled, stigma 1, fruit a drupe, 2-celled and 2-seeded; flowers in cymes or heads, the latter margined with large petal-like bracts; shrubs or trees with whorled, opposite or alternate, simple usually entire leaves.

CÓRNUS Linné 1753 CORNEL, DOGWOOD
(Lat. *cornus*, dogwood)
Pl. 35, fig. 2-3.

Characters of the family.

1. Plant herb-like, 2-10 in. high; upper leaves ovoid, in a whorl; flower cluster resembling a flower, with 4-6 petal-like bracts, 1-2.5 cm. wide — *C. canadénsis*
2. Shrubs with opposite leaves, 3-10 ft. high
   a. Leaves woolly beneath — *C. baileyi*
   b. Leaves smooth or sparsely hairy beneath — *C. stolonifera*

APIÁCEAE PARSLEY FAMILY

Sepals 5, united and grown to the ovary, the lobes or teeth often inconspicuous, petals 5, on the margin of the calyx, often 2-lobed and sometimes irregular, stamens 5, ovary 2-celled, styles 2, often borne on a flattened or conic base, the stylopodium, ovule 1 in each cell, fruit dry, of 2 carpels, when ripe usually separating along their faces, i. e. commissure, often flattened parallel to the commissure, i. e., dorsally, or at right angles to the commissure, i. e., laterally, or nearly round; each carpel with 5 main ribs and sometimes with 4 secondary ones, all or some of them often winged, the wall of the carpel usually with oil-tubes in the intervals between the ribs and on the side toward the commissure; flowers perfect, sometimes polygamous, in simple or compound umbels, rarely in head-like clusters; leaves alternate, simple to variously compound; herbs.

1. Fruit with hooked bristles; leaves digitately divided — SANICULA
2. Fruit without hooked bristles; leaves various
   a. Leaves simple, perfoliate — BUPLEURUM
   b. Leaves, or at least some of them, not simple
      (1) Fruit linear-club-shaped, usually bristly on the margins — WASHINGTONIA
      (2) Fruit not linear-club-shaped and not bristly
         (a) Fruit strongly flattened paralled to the commissure, i.e., dorsally
            x. Oil-tubes solitary in the intervals
               (x) Stylopodium conic
                  m. Stems 1-2 ft. high; leaves pinnate, of 5-9 leaflets — OXYPOLIS
                  n. Stems 2-8 ft. high; leaves ternate with 3 large leaflets — HERACLEUM
               (y) Stylopodium flat or none
                  m. Plants stemmed, 1-4 ft. high
                     (m) Flowers white, greenish or purplish — ANGELICA
                     (n) Flowers yellow — PASTINACA

n. Plants stemless or nearly so
(m) Calyx-teeth and stylopodium evident — CYNOMARATHRUM
(n) Calyx-teeth and stylopodium none — LOMATIUM
y. Oil-tubes more than 1 in the intervals
(x) Plants stemmed, 1-3 ft. high
m. Flowers white, greenish or purplish
(m) Leaves 2-3-ternate, then 1-2-pinnate — CONIOSELINUM
(n) Leaves 1-2-pinnate or 1-ternate and then 1-2-pinnate — ANGELICA
n. Flowers yellow or purple — PSEUDOCYMOPTERUS
(y) Plants stemless or nearly so
m. Lateral wings of the carpel thin
(m) Calyx-teeth and stylopodium evident — CYNOMARATHRUM
(n) Calyx-teeth and stylopodium none — LOMATIUM
n. Lateral wings of the carpel thick
(m) Dorsal ribs very prominent or slightly winged — PSEUDOCYMOPTERUS
(n) Dorsal ribs thread-like or prominently winged
r. Leaves 1-2-pinnate — CYMOPTERUS
s. Leaves 3-5-pinnate — LEPTOTAENIA
(b) Fruit flattened little or not at all dorsally, sometimes flattened at right-angles to the commissure, i. e., laterally
x. Oil-tubes solitary in the intervals
(x) Flowers white; stylopodium conic
m. Involucre present; leaflets usually linear to thread-like — CARUM
n. Involucre none; leaflets lance-linear to lanceolate — CICUTA
(y) Flowers yellow; stylopodium flat or none
m. Carpel with equal broad ribs
(m) Fruit globose, scarcely flattened; stems tufted 1-4 in. high — OREOXIS

(n) Fruit ovate, flattened; stems 1-3 ft. high — HARBOURIA

n. Carpels with winged or thread-like ribs

(m) Ribs or some of them with wings — THASPIUM

(n) Ribs not winged

r. Fruit cylindric; plant stemless; leaves pinnate — ALETES

s. Fruit ovoid, flattened; stems 2-3 ft. high; leaves simple or ternate — ZIZIA

y. Oil-tubes more than 1 in the intervals

(x) Stylopodium conic

m. Fruit round; leaves once-pinnate; aquatic — BERULA

n. Fruit ovate to oblong

(m) Plants stemmed; leaves ternate then pinnate — LIGUSTICUM

(n) Plants stemless; leaves once-pinnate — LIGUSTICELLA

(y) Stylopodium flat or none

m. Carpels with winged ribs

(m) Seed with a narrow deep groove on the face — AULOSPERMUM

(n) Seed-face plane or with a broad shallow concavity

r. Leaves 1-3-pinnate; flowers white, pink or purple — PHELLOPTERUS

s. Leaves ternate; flowers yellow — PTERYXIA

n. Carpels with the ribs not winged

(m) Ribs thread-like — MUSINEUM

(n) Some of the ribs thick and corky

r. Dorsal ribs filiform; lateral ribs thick and corky — OROGENIA

s. All the ribs equally prominent and corky

(r) Leaves entire, clasping or perfoliate — BUPLEURUM

(s) Leaves pinnate; aquatic — SIUM

ALÉTES Coulter and Rose 1900
(Gr. *aletes,* wanderer)
Pl. 35, fig. 15, 25.

Sepals 5, united and grown to the ovary, the teeth prominent, petals 5, white, stamens 5, ovary 2-celled, styles 2 without a base or stylopodium, fruit oblong or short cylindric, the ridges equal and distinct, oil-tubes solitary in the intervals, 2 next the commissure and 1 in each ridge; leaves pinnate with toothed leaflets; stemless perennial.

Flower-stalks shorter than the leaves; leaflets variously lobed or cleft; fruit 4-6 mm. long — *A. acaúlis*

ANGÉLICA Linné 1753
(Named for supposed medicinal properties)
Pl. 35, fig. 21.

Sepals 5, united and grown to the ovary, teeth none or small, petals 5, usually white, more rarely greenish-yellow or purplish, stamens 5, ovary 2-celled, stylopodium flattened, fruit ovoid, compressed dorsally, dorsal and intermediate ribs prominent, lateral ribs broadly winged, oil-tubes 1-several in the intervals, 2-10 on the commissure side; leaves once or twice pinnate or ternate-pinnate; leafy stemmed perennial.

1. Leaves ternately divided, then once or twice pinnate
   a. Oil-tubes solitary in the intervals
      (1) Fruit smooth — *A. lỳalli*
      (2) Fruit rough or hairy — *A. roseána*
   b. Oil-tubes many — *A. ámpla*
2. Leaves once or twice pinnate
   a. Leaves once pinnate; involucel absent — *A. pinnáta*
   b. Leaves twice pinnate; involucel of conspicuous bracts — *A. grávi*

AULOSPÉRMUM Coulter and Rose 1900
(Gr. *aulos,* groove, *sperma,* seed)

Sepals 5, united and grown to the ovary, the teeth evident, petals 5, white, yellow or purple, stamens 5, ovary 2-celled, stylopodium none, fruit oblong to round with 3-5 rather broad wings on each half, oil-tubes several in the intervals, 2 or more on the commissure side; leaves usually 1-3-pinnate, often much dissected; stemless or stemmed perennial.

1. Stem more or less evident; fruit 4-8 mm. long
   a. Flowers yellow — *A. lóngipes*

b. Flowers white to purplish *A. ibapénse*

2. Stem lacking; flowers yellowish-purple; fruit 8-10 mm. long *A. purpúreum*

BÉRULA Hoffmann 1821
(The Latin name of the water-cress)
Pl. 35, fig. 16.

Sepals 5, united and grown to the ovary, teeth inconspicuous, petals 5, white, stamens 5, ovary 2-celled, stylopodium conic, fruit nearly globose, the ribs thin, oil-tubes many and close together on the commissure side; flowers in compound umbels with both involucre and involucels; leaves pinnate; stemmed aquatic or marsh perennial.

Stems .5-3 ft. high; leaflets 7-19, ovate to linear-oblong; fruits about 1.5 mm. long *B. erécta*

BUPLEÚRUM Linné 1753
(Gr. *bous*, ox, *pleuron*, side, rib, from the ribbed leaves)
Pl. 35, fig. 14.

Sepals 5, united and grown to the ovary, teeth none, petals 5, yellow or greenish-yellow, stamens 5, ovary 2-celled, stylopodium conic, fruit oblong or oval, slightly compressed, carpels angled with thin equal ribs, oil-tubes none; flowers in compound umbels with conspicuous involucels; leaves simple, entire, clasping or perfoliate; stemmed annual or perennial.

Leaves oblong to lanceolate or linear, more or less clasping *B. americánum*

CÁRUM Linné 1753 CARAWAY
(The Greek name of the caraway)

Sepals 5, united and grown to the ovary, teeth tiny, petals 5, white, stamens 5, ovary 2-celled, stylopodium conic, fruit ovate or oblong, somewhat flattened, carpels somewhat 5-sided, the ribs thin or none, oil-tubes solitary in the intervals, 2 on the commissure side; flowers in compound umbels; leaves pinnate or ternate; stemmed biennial or perennial.

1. Leaves once-pinnatifid; native *C. gairdneri*
2. Leaves twice-pinnatifid; cultivated or escaped as a weed *C. cárui*

CICÚTA Linné 1753
(The Latin name)
Pl. 35, fig. 12.

Sepals 5, united and grown to the ovary, teeth small, petals 5, white, stamens 5, ovary 2-celled, stylopodium low conic, fruit ovate to oblong,

slightly flattened with low corky ribs, oil-tubes solitary in the intervals, 2 on the commissure side; flowers in compound umbels; leaves 2-3-pinnate; stem perennial.

Stems 3-8 ft. high; leaves 2-3-pinnate; leaflets lanceolate; fruits 2-3 mm. long — *C. maculáta*

Conioselínum Hoffmann 1814
(From the names of two similar genera)

Sepals 5, united and grown to the ovary, teeth none, petals 5, white, stamens 5, ovary 2-celled, stylopodium low conic, fruit oval to oblong, flattened dorsally, carpels with prominent ribs, the lateral ribs broadly winged, oil-tubes usually 2-3 in the intervals and 4-8 on the commissure side; flowers in compound umbels; leaves pinnate; stemmed perennial.

Stems 2-5 ft. high; leaves twice pinnate; leaflets pinnatifid; fruit 4 mm. long — *C. scopulórum*

Cymópterus Rafinesque 1819
(Gr. *kyme,* wave, *pteron,* wing, from the fruit)
Pl. 35, fig. 27.

Sepals 5, united and grown to the ovary, teeth usually distinct, petals 5, white or yellow, stamens 5, ovary 2-celled, stylopodium none, fruit ovoid, flattened dorsally, carpels with 3-5 equal wings, oil-tubes 1-several in the intervals; flowers in terminal umbels; leaves once to twice pinnate; stemless dry land perennial.

1. Flowers white
   - a. Each carpel of the fruit broadly 3-5-winged — *C. acaúlis*
   - b. Each carpel with but 2 lateral wings — *C. lapidósus*
2. Flowers yellow
   - a. Leaves 2-3-pinnate — *C. féndleri*
   - b. Leaves once pinnate or merely lobed — *C. newbérryi*

Cynomaráthrum Coulter and Rose 1900
(Gr. *kyon, kynos,* dog, *marathron,* fennel)

Sepals 5, united and grown to the ovary, teeth evident, petals 5, yellow, stamens 5, ovary 2-celled, stylopodium flat; fruit oblong, flattened dorsally, each carpel with distinct or winged ribs, broadly winged laterally, oil-tubes usually 3-5 in the intervals, 6-10 on the commissure side; flowers in terminal umbels; leaves 1-2-pinnate; mostly stemless perennials.

1. Pedicels 2-6 mm. long, shorter than the fruit; leaves smooth — *C. nuttálli*

2. Pedicels 12-18 mm. long, longer than the fruit; leaves rough *C. eastwoódae*

HARBOÚRIA Coulter and Rose 1888
(Named for Harbour, an early collector in the Rocky Mountains)
Pl. 35, fig. 13.

Sepals 5, united and grown to the ovary, the teeth evident, petals 5, yellow, stamens 5, ovary 2-celled, stylopodium low or none, fruit ovate, flattened laterally, each carpel with broad, prominent ribs, oil-tubes solitary in the intervals, 2 on the commissure side; flowers mostly in paired umbels; leaves ternately compound with thread-like divisions; stemmed perennial.

Stems 1-2.5 ft. high; fruit 4 mm. long *H. trachypleúra*

HERÁCLEUM Linné 1753
(Gr. *Herakleios*, of Hercules, from its great size)
Pl. 35, fig. 29.

Sepals 5, united and grown to the ovary, petals 5, white, stamens 5, ovary 2-celled, stylopodium conic, fruit obovoid, strongly flattened dorsally, the carpels with thin dorsal and intermediate ribs, and broad lateral wings, oil-tubes solitary in the intervals, 2-4 on the commissure side; leaves large, ternately-compound; flowers in compound umbels; tall stemmed perennial.

Stems 3-8 ft. high; leaves of 3 leaflets, often a foot or more long; fruits 8-12 mm. long *H. lanátum*

LEPTOTÉNIA Nuttall 1840
(Gr. *leptos*, thin, *taenia*, band)
Pl. 35, fig. 20.

Sepals 5, united and grown to the ovary, teeth usually none, petals 5, yellow or purple, stamens 5, ovary 2-celled, stylopodium none, fruit oblong, flattened dorsally, each carpel with thin dorsal and intermediate ribs, the lateral ribs with thick corky wings, oil-tubes 3-6 in the intervals, 4-6 on the commissure side, sometimes wanting; flowers in compound umbels; leaves pinnate, much dissected; tall perennials.

1. Leaves cut into very fine divisions; oil-tubes usually none *L. multífida*
2. Leaves less dissected; oil-tubes present *L. eátoni*

LIGUSTICÉLLA Coulter and Rose 1909
(Diminutive of Ligusticum)

Sepals 5, united and grown to the ovary, teeth evident, petals 5, yellowish-green, stamens 5, ovary 2-celled, stylopodium conic, fruit ovate,

flattened laterally, each carpel with all the ribs thin, oil-tubes 2-3 in the intervals, 4 on the commissure side; flowers in terminal umbels; leaves once pinnate; stemless perennial.

Plants 4-12 in. high; leaflets 7-13, oval; fruit 3 mm. long — *L. eastwoódae*

Ligústicum Linné 1753

(Named from the country Liguria)

Pl. 35, fig. 19.

Sepals 5, united and grown to the ovary, teeth tiny or none, petals 5, white or pinkish, stamens 5, ovary 2-celled, stylopodium conic, fruit oblong or ovate, little or not at all flattened, each carpel with prominent equal ribs, oil-tubes 2-5 in the intervals, 6-10 on the commissure side; leaves ternately or pinnately compound; stemmed perennial.

1. Stems leafy; ribs of the fruit somewhat winged
   a. Fruit 4-5 mm. long — *L. símulans*
   b. Fruit 6-7 mm. long
      (1) Leaf segments narrowly linear — *L. filicínum*
      (2) Leaf segments lanceolate to lance-ovate — *L. pórteri*
2. Stems naked or nearly so; leaf segments linear or thread-like — *L. tenuifólium*

Lomátium Rafinesque 1819 Wild Parsley

(Gr. *lomation*, little fringe, perhaps from the leaves)

(Cogswellia Rafinesque)

Pl. 35, fig. 22.

Sepals 5, united and grown to the ovary, teeth inconspicuous, petals 5, yellow, white, or purple, stamens 5, ovary 2-celled, stylopodium none, fruit oblong to round strongly flattened dorsally, each carpel with thread-like dorsal and intermediate ribs, the lateral ribs winged, oil-tubes 1-several in the intervals, rarely none, 2-10 on the commissure side; leaves ternate, pinnate or dissected; stemmed or stemless.

1. Flowers yellow or purple
   a. Stems from tubers
      (1) Umbels open; fruit 6-8 mm. long on pedicels 4-8 mm. long — *L. ambíguum*
      (2) Umbels dense; fruit 9-10 mm. long, nearly sessile — *L. leptocárpum*
   b. Stems from a thick root or rootstock
      (1) Plant smooth or nearly so; fruit smooth
         (a) Fruits 5-6 mm. long; leaves 2-pinnate — *L. montánum*

(b) Fruits 8-16 mm. long; leaves ternate, then pinnate
x. Fruit 10-12 mm. long; wings narrow, ribs inconspicuous *L. bícolor*
y. Fruit 8-16 mm. long; wings more than half as broad as carpel; ribs thread-like *L. gráyi*
(2) Plants hairy, at least when young; fruits usually hairy also
(a) Leaves finely dissected, ternate then pinnate *L. foeniculáceum*
(b) Leaves 1-2-ternate *L. platycárpum*
2. Flowers white
a. Fruit oblong, 6-20 mm. long; bracts of the involucel not papery-margined *L. macrocárpum*
b. Fruit oval to round, 4-6 mm. long; bracts of the involucel papery-margined *L. nudicaúle*

MUSÍNEUM Rafinesque 1820
(A Greek name for fennel)
Pl. 35, fig. 17.

Sepals 5, united and grown to the ovary, teeth prominent, petals 5, yellow, stamens 5, ovary 2-celled, stylopodium low, fruit ovate to oblong, somewhat flattened laterally, each carpel flattened dorsally with thin narrow ribs, oil-tubes usually 3 in the intervals, 2-4 on the commissure side; leaves ternate or pinnate, usually much dissected; low or stemless perennials.

1. Stems 6-10 in. high; leaf segments mostly oblong to ovate *M. divaricátum*
2. Plant stemless; leaf segments narrowly linear *M. tenuifólium*

OREÓXIS Rafinesque 1830
(Gr. *oros, oreos,* mountain, perhaps from the habitat)
Pl. 35, fig. 11.

Sepals 5, united and grown to the ovary, teeth prominent, petals 5, yellow, stamens 5, ovary 2-celled, stylopodium none, fruit globose, each carpel with thick equal corky ribs, oil-tubes 1-3 in the intervals, 2 on the commissure side; leaves pinnate, the leaflets cleft into narrow segments; tufted alpine perennials.

1. Plants smooth or nearly so; oil-tubes more than 1 in the intervals *O. húmilis*
2. Plants finely hairy; oil-tubes 1 in the intervals *O. alpína*

PLATE 35

PARSLEYS—HONEYSUCKLES

GINSENG FAMILY

1. Aralia nudicaulis: Wild Sarsaparilla

DOGWOOD FAMILY

2. Cornus canadensis: Cornel
3. Cornus baileyi: Dogwood

MOSCHATEL FAMILY

4. Adoxa moschatellina

HONEYSUCKLE FAMILY

5. Lonicera involucrata: Honeysuckle
6. Viburnum pauciflorum: Bush Cranberry
7. Sambucus racemosa: Elderberry

MADDER FAMILY

8. Galium boreale: Bedstraw

PARSLEY FAMILY

9–30. Fruit clusters and fruits, the latter natural size except where indicated

9. Sanicula marilandica: x2
10. Washingtonia obtusa
11. Oreoxis alpina, x2
12. Cicuta maculata, x2
13. Harbouria trachypleura, x2
14. Bupleurum americanum, x2
15. Aletes acaulis
16. Berula erecta, x2
17. Musineum divaricatum, x3
18. Sium cicutifolium, x2
19. Ligusticum porteri
20. Leptotaenia multifida
21. Angelica grayi
22. Lomatium nudicaule
23. Pseudocymopterus montanus
24. Pseudocymopterus anisatus
25. Aletes acaulis
26. Oxypolis fendleri, x2
27. Cymopterus acaulis
28. Phellopterus purpurascens
29. Heracleum lanatum
30. Orogenia linearifolia, x2

Orogénia Watson 1871

(Gr. *oros*, mountain, *genos*, born)

Pl. 35, fig. 30.

Sepals 5, united and grown to the ovary, teeth tiny, petals 5, white, stamens 5, ovary 2-celled, fruit oblong, each carpel strongly flattened dorsally, dorsal and intermediate ribs thin, lateral ribs greatly corky-thickened; leaves 1-2-ternate, leaflets entire; stemless perennial.

Stalks 1-5 in. high from a tuber; leaves 2-3; fruit 3-4 mm. long — *O. linearifólia*

Oxýpolis Rafinesque 1830

(Of uncertain origin and meaning)

Pl. 35, fig. 26.

Sepals 5, united and grown to the ovary, teeth evident, petals 5, white, stamens 5, ovary 2-celled, stylopodium low conic, fruit ovoid, somewhat flattened laterally, each carpel with thin dorsal and intermediate ribs, the lateral ribs winged, oil-tubes solitary in the intervals, 2-6 on the commissure side; leaves once pinnate or ternate, or sometimes reduced to the petiole alone; stemmed perennial.

Stems 1-2.5 ft. high from a group of tubers; leaflets 5-9, ovate to lance-ovate; fruit 3-4 mm. long — *O. féndleri*

Pastináca Linné 1753

(Lat. name of the parsnip, from *pastus*, food)

Sepals 5, united and grown to the ovary, teeth none, petals 5, yellow, stamens 5, ovary 2-celled, stylopodium low, fruit oval, much flattened dorsally, each carpel with thread-like dorsal and intermediate ribs, the lateral ribs winged, oil-tubes solitary in the intervals and 2-4 on the commissure side; leaves pinnate; stemmed biennials.

Stems 2-5 ft. high; leaflets ovate, 1-3 in. long; fruit 5-8 mm. long — *P. sativa*

Phellópterus Nuttall 1840

(Gr. *phellos*, cork, *pteron*, wing)

Pl. 35, fig. 28.

Sepals 5, united and grown to the ovary, teeth evident, petals 5, white to pink or purple, stamens 5, ovary 2-celled, stylopodium none, fruit oblong to round, each carpel with 3-5 broad wings, oil-tubes 1-3 in the intervals, 4-8 on the commissure side; leaves 1-3-pinnate; stemless or short-stemmed perennials.

1. Flowers white; fruit 6-8 mm. long *P. montánus*
2. Flowers pinkish to purple
   a. Bracts of the involucel 1-3-nerved
      (1) Fruits oblong, 8 mm. long *P. bulbósus*
      (2) Fruits round, 10-12 mm. long *P. purpuráscens*
   b. Bracts of the involucel many-nerved; fruit 12-15 mm. long *P. multinervátus*

PSEUDOCYMÓPTERUS Coulter and Rose 1888
(Gr. *pseudes,* false, from its relationship to Cymopterus)
Pl. 35, fig. 23-24; Pl. 36, fig. 7.

Sepals 5, united and grown to the ovary, teeth evident, petals 5, usually yellow to purple, stamens 5, ovary 2-celled, stylopodium none, fruit oblong to rounded, each carpel with prominent and intermediate ribs, the lateral ribs rather broadly and thickly winged, oil-tubes 1-4 in the intervals, 2-8 on the commissure side; leaves twice pinnate; stemless or stemmed perennials.

1. Stems leafy, .5-3 ft. high; flowers yellow to purple *P. montánus*
2. Stemless, leaves basal; flowers white or yellow *P. anisátus*

PTERÝXIA Nuttall 1840
(Gr. *pteryx,* wing, from the wings of the fruit)

Sepals 5, united and grown to the ovary, teeth evident, petals 5, yellow, stamens 5, ovary 2-celled, stylopodium none, fruit oblong to round, each carpel strongly flattened dorsally, dorsal and intermediate ribs prominent or broadly winged, lateral ribs broadly winged, oil-tubes several in the intervals; leaves ternate, then pinnately dissected; stemless perennials.

1. Flowers yellow; fruit oblong, 6-7 mm. long *P. calcárea*
2. Flowers white; fruit roundish, 4 mm. long *P. albiflóra*

SANÍCULA Linné 1753
(From the Latin *sano,* to heal)
Pl. 35, fig. 9.

Sepals 5, united and grown to the ovary, teeth conspicuous, petals 5, greenish-white, stamens 5, ovary 2-celled, fruit slightly flattened, more or less globose, covered with hooked bristles, carpels ribless, the oil-tubes usually 5; flowers in small globose umbels, the clusters with leaf-like involucres; leaves digitately 3-7-divided; stemmed perennial.

Stems 1-4 ft. high; leaflets oblanceolate to obovate; fruit 5-6 mm. long *S. marilándica*

Sium Linné 1753

(The Greek name of a marsh plant)

Pl. 35, fig. 18.

Sepals 5, united and grown to the ovary, teeth tiny, petals 5, white, stamens 5, ovary 2-celled, stylopodium low, fruit flattened laterally, ovate to oblong, each carpel with prominent nearly equal ribs, oil-tubes 1-3 in the intervals, 2-6 on the commissure side; leaves pinnate; stemmed aquatic or marsh perennial.

Stems 2-6 ft. high; leaflets 3-8 pairs, linear to lanceolate, toothed; fruit 3 mm. long — *S. cicutifólium*

Thaspium Nuttall 1818

(Gr. *thapsia*, plant with a yellow dye)

Sepals 5, united and grown to the ovary, teeth evident, petals 5, yellow, stamens 5, ovary 2-celled, stylopodium none, fruit ovoid, each carpel with all the ribs strongly winged, oil-tubes solitary in the intervals, 2 on the commissure side; leaves ternate; tall stemmed perennial.

Stems 2-5 ft. high; basal leaves mostly heart-shaped, stem-leaves once-ternate; fruits globose-ovoid, 4-5 mm. long — *T. trifoliátum*

Washingtónia Rafinesque 1818

(Named for George Washington)

Pl. 35, fig. 10.

Sepals 5, united and grown to the ovary, teeth none, petals 5, white or purple, stamens 5, ovary 2-celled, stylopodium conic, fruit more or less club-shaped, usually tapering to the base, and hairy; leaves 2-3-ternate; stemmed perennials.

1. Fruits bristly-hairy
   a. Involucel present; style and base 2 mm. long; fruits 12 mm. long — *W. longístylis*
   b. Involucel wanting as a rule; style and base less than 1 mm. long; fruits 15-20 mm. long — *W. obtúsa*
2. Fruits smooth; style and base 1-2 mm. long; fruits 12-16 mm. long — *W. occidentális*

Zizia Koch 1825

(Named for Ziz, a German botanist)

Sepals 5, united and grown to the ovary, teeth prominent, petals 5, yellow, stamens 5, ovary 2-celled, stylopodium none, fruit ovoid to oblong,

somewhat flattened, the ribs thread-like, oil-tubes solitary in the intervals with a small one beneath each rib; flowers in compound umbels; lower leaves sessile, deeply heart-shaped, stem-leaves mostly ternate; perennial. Stems 2-3 ft. high; lower leaves 4-6 in. long; fruit ovate, 3 mm. long *Z. cordáta*

RUBIALES MADDER ORDER

RUBIÁCEAE MADDER FAMILY

Sepals 4, united into a tube grown to the ovary, petals 4, white, greenish or yellow, united into a saucer-shaped corolla, stamens usually 4, ovary 2-celled, ovule 1 in each cell, styles 2, fruit separating into 2 closed carpels; flowers in axillary or terminal cymes or panicles, usually perfect; annual or perennial herbs with whorled, simple, mostly entire leaves.

GÁLIUM Linné 1753 BEDSTRAW

(Gr. *gala*, milk, which some species curdle)

Pl. 35, fig. 8.

Characters of the family.

1. Flowers with stamens and pistils
   - a. Annual
     - (1) Leaves usually 4 in a whorl; stems smooth *G. bifólium*
     - (2) Leaves 6-8 in a whorl; stems rough-angled *G. aparine*
   - b. Perennial
     - (1) Stems erect; leaves 3-nerved; fruit white-hairy, often smooth *G. boreále*
     - (2) Stems weak; leaves 1-nerved
       - (a) Leaves sharp-pointed at tip, oval *G. triflórum*
       - (b) Leaves not sharp-pointed
         - x. Fruit with hooked hairs *G. trifidum*
         - y. Fruit without hooked hairs
           - (x) Leaves obovate, 8-10 mm. long; fruit smooth *G. brandégei*
           - (y) Leaves lanceolate, 1-2 cm. long; fruit rough *G. aspérrimum*
2. Flowers with only stamens or pistils; leaves linear *G. coloradénse*

CAPRIFOLIÁCEAE HONEYSUCKLE FAMILY

Sepals 3-5, united and grown to the ovary, petals 5, united into a saucer-shaped to tubular corolla, often 2-lipped, stamens usually 5 on the

tube of the corolla, ovary 1-6-celled, stigma globose or 2-5-lobed, fruit a 1-6-celled berry, drupe or capsule; flowers mostly clustered, sometimes in pairs; shrubs, herbs, or vines with opposite simple or pinnate leaves.

1. Corolla shallow, mostly saucer-shaped; stigma on a very short style; fruit drupe-like
   a. Leaves simple — VIBURNUM
   b. Leaves pinnate — SAMBUCUS
2. Corolla long, bell-shaped to tubular; stigma on a long style; fruit a berry or dry
   a. Stems trailing; flowers terminal, paired — LINNAEA
   b. Stems erect or climbing, a foot or more high; flowers clustered, or axillary when paired
      (1) Corolla regular, bell-shaped — SYMPHORICARPUS
      (2) Corolla irregular, usually tubular — LONICERA

LINNAÉA Gronovius 1753 TWIN FLOWER
(Named for Linnaeus, the great Swedish botanist)
Pl. 36, fig. 4.

Sepals 5, united, petals 5, pink or purplish, united into a bell-shaped regular corolla, stamens 4 on the corolla tube, in 2 pairs, ovary 3-celled with a single perfect ovule, fruit 3-celled, 1-seeded; flowers terminal, in pairs on long stalks; leaves opposite, evergreen, simple; somewhat woody, creeping herb.

Stems 3-8 in. high; leaves 1-2 cm. long; flowers 10-15 mm. long — *L. boreális*

LONÍCERA Linné 1753 HONEYSUCKLE
(Named for Lonitzer, a German botanist)
(Distegia Rafinesque)
Pl. 35, fig. 5.

Sepals 5, united, the teeth small, petals 5, white to pink, red or yellow, united into a mostly tubular 2-lipped corolla, stamens 5 on the corolla tube, ovary 2-3-celled, ovules many, stigma globose, berry fleshy, 2-3-celled, few-seeded; flowers in clusters or twos; leaves opposite simple entire; shrubs or woody climbers.

1. Flowers in pairs; erect shrubs
   a. Bracts of the cluster large and leaf-like, enclosing the fruit — *L. involucráta*
   b. Bracts small or none
      (1) Berry bluish-black — *L. caerúlea*
      (2) Berry red — *L. utahénsis*

2. Flowers 4-several in a cluster; stems climbing or clambering *L. glaucéscens*

SAMBÚCUS Linné 1753 ELDERBERRY
(The Latin name for the elder)
Pl. 35, fig. 7.

Sepals 3-5, united, petals 3-5, white, united into a saucer-shaped corolla, stamens 5, at the base of the corolla, ovary 3-5-celled, styles 3-parted, fruit a berry-like drupe with 3-5 nutlets; flowers in large compound cymes; leaves opposite, pinnate; shrubs.

1. Flower cluster flat-topped; fruit purplish-black, 5-6 mm. wide *S. canadénsis*
2. Flower cluster panicle-like, not flat-topped
   a. Cluster convex; fruit black *S. melanocárpa*
   b. Cluster conic or somewhat so; fruit bright red *S. racemósa*

SYMPHORICÁRPUS Jussieu 1789 SNOWBERRY, WOLFBERRY
(Gr. *symphoros,* borne together, *karpos,* fruit, from the clustered berries)
Pl. 36, fig. 5.

Sepals 4-5, united, petals 4-5, white or pink, united into a bell-shaped corolla, stamens 4-5 on the corolla tube, ovary 4-celled, stigma globose or 2-lobed, berry 4-celled, 2-seeded; flowers in axillary or terminal clusters; leaves opposite, simple, entire or nearly so; shrubs.

1. Corolla 3-5 mm. long
   a. Stamens and style projecting from the corolla; clusters many-flowered *S. occidentális*
   b. Stamens and style not projecting; clusters few-flowered *S. racemósus*
2. Corolla 6-12 mm. long
   a. Corolla 6-8 mm. long, the tube 2-3 times the length of the lobes *S. rotundifólius*
   b. Corolla 8-12 mm. long, the tube 4-5 times the length of the lobes *S. oreóphilus*

VIBÚRNUM Linné 1753 BUSH CRANBERRY, CRANBERRY TREE
(The Latin name)
Pl. 35, fig. 6.

Sepals 5, united into a tube, petals 5, white or pink, united into a shallow corolla, stamens 5 on the corolla tube, ovary 1-3-celled, style 3-lobed, drupe 1-seeded; flowers in compound cymes, the outer sometimes without stamens or pistils; leaves opposite, entire to lobed; shrub.

PLATE 36

PARSLEYS—HONEYSUCKLES—BLUEBELLS

PARSLEY FAMILY

7. Pseudocymopterus montanus

HONEYSUCKLE FAMILY

4. Linnaea borealis: Twin Flower
5. Symphoricarpus occidentalis: Snowberry

BLUEBELL FAMILY

1. Campanula parryi: Bluebell
2. Campanula rotundifolia
6. Campanula uniflora

VALERIAN FAMILY

3. Valeriana silvatica: Valerian

ROCKY MOUNTAIN FLOWERS

PLATE 36.

1. Leaves not lobed, with a single midrib, the veins pinnate; fruit bluish-black *V. lentágo*
2. Leaves mostly 3-lobed, with 3 prominent veins; fruit red
   a. Outer flowers of the cluster large, without stamens and pistils; clusters 3-4 in. wide; rare *V. ópulus*
   b. Outer flowers not large and sterile; clusters less than 1 in. wide; common *V. pauciflórum*

ADOXÁCEAE MOSCHATEL FAMILY

Sepals 2-3, united and grown to the ovary, petals 4-6, green, united into a regular saucer-shaped corolla, stamens twice as many, in pairs on the corolla tube, ovary 3-5-celled, style 3-5-parted, fruit a drupe with 3-5 nutlets; flowers in terminal globose clusters; low perennial herbs with basal and opposite, ternate leaves.

Adóxa Linné 1753 Moschatel, Muskroot

(Gr. *a*, without, *doxa*, glory, from its small green flowers)
Pl. 35, fig. 4.

Characters of the family.

Stems 2-6 in. high; leaf-segment 3-cleft or 3-parted; flowers 3-6 in a head *A. moschatéllina*

CAMPANALES BLUEBELL ORDER

CAMPANULÁCEAE BLUEBELL FAMILY

Sepals mostly 5, united and grown to the ovary, petals 5, united into a regular or irregular corolla, the latter bell-shaped, saucer-shaped or 2-lipped, stamens 5 on the corolla tube, ovary 2-5-celled, rarely 1-celled, stigma 2-5-lobed, fruit a capsule or berry; flowers solitary or clustered, mostly terminal; annual or perennial herbs with alternate, entire, toothed or lobed leaves.

1. Corolla regular; anthers separate from each other
   a. Corolla bell-shaped; flowers all alike Campanula
   b. Corolla saucer-shaped; earlier flowers small and green, without corolla Specularia
2. Corolla irregular; anthers united around the style
   a. Corolla split to the base on one side Lobelia
   b. Corolla not split Laurentia

Campánula Linné 1753 Bluebell

(Diminutive of It. *compana,* bell)

Pl. 36, fig. 1, 2, 6.

Sepals 5, united, petals 5, usually blue or purple, rarely white, united into a bell-shaped corolla, stamens 5, free from the corolla, ovary 3-5-celled, stigma 3-5-lobed, capsule crowned by the long calyx-lobes, opening by 3-5 small holes; flowers solitary or clustered; leaves alternate, entire or toothed, rarely lobed; annual or perennial.

1. Flowers nodding; corolla deeply bell-shaped, 1.5-3 cm. long; fruit nodding — *C. rotundifólia*
2. Flowers erect, spreading or horizontal, not nodding
   a. Corolla tubular bell-shaped, 8-12 mm. long; flowers solitary; at 12-14,000 ft. — *C. uniflóra*
   b. Corolla broadly open; flowers often 2 or more; at 5-12,000 ft.
      (1) Flowers about 1 cm. wide, several-many in an open cluster — *C. aparinoides*
      (2) Flowers 2-3 cm. wide, 1-few in a cluster — *C. párryi*

Lauréntia Micheli 1729

(From Laurent, a French botanist)

Sepals 5, united, petals 5, blue, united into a closed tube, 2-lipped, stamens 5, united by the anthers, ovary 2-celled, fruit a capsule, opening at the top; flowers few, axillary; leaves alternate, simple; perennial.

Stems 4-5 in. high; leaves linear, 1.5-3 cm. long — *L. exímia*

Lobélia Linné 1753 Lobelia, Cardinal Flower

(Named for de L'Obel, a French botanist)

Sepals 5, united, petals 5, red, blue or white, united into a 2-lipped corolla, split to the base on one side, stamens 5, united by the anthers, ovary 2-celled, capsule 2-valved from the top; flowers in long racemes; leaves alternate, simple; perennial.

1. Flowers red, 2-2.5 cm. long — *L. cardinális*
2. Flowers blue, rarely white, 1-1.5 cm. long — *L. syphilítica*

Specularia Heister 1830 Venus' Looking Glass

(Latin *speculum,* looking-glass)

Sepals 3-5, united, petals 5, blue, united into a saucer-shaped corolla, the earlier flowers without petals, stamens 5, ovary 3-celled, stigma 3-lobed, capsule opening by lateral valves; flowers axillary, the earlier small, green,

closed, the latter with a blue corolla; leaves alternate, simple, entire or toothed; annual.

1. Leaves linear to lance-oblong, sessile *S. leptocárpa*
2. Leaves rounded or broadly ovate, clasping by a heart-shaped base *S. perfoliáta*

ASTERALES ASTER ORDER

VALERIANACEAE VALERIAN FAMILY

Sepals united and grown to the ovary, the lobes none in flower but becoming a feathery pappus in fruit, petals usually 5, united into a regular or irregular corolla, stamens 3 on the corolla tube, ovary 1-3-celled, fruit an achene with feathery pappus; flowers perfect or dioecious in clustered cymes; herbs with opposite simple to pinnate leaves.

Valeriána Linné 1753 Valerian

(Lat. *valeo*, to be strong, from the strong odor)

Pl. 36, fig. 3.

Characters of the family.

1. Flowers in a flat-topped cluster; leaves thin, netted-veined, the segments usually toothed *V. silvática*
2. Flowers in a long panicle-like cluster; leaves thick, parallel-veined, the segments entire *V. edúlis*

ASTERACEAE ASTER OR COMPOSITE FAMILY

Sepals usually 5, united and grown to the ovary, usually developing in fruit into a pappus of awns, bristles, hairs, scales or teeth, sometimes lacking, petals usually 5, united into a regular tubular corolla in the disk flowers and into an irregular ribbon-like corolla in the marginal or ray flowers, stamens usually 5, united by their anthers, on the corolla tube, style 2-cleft at the apex, the ray flowers often without stamens or style, ovary 1-celled, becoming a 1-seeded achene usually crowned by the pappus; flowers grouped in dense clusters called heads, each one popularly regarded as a flower, enclosed in an involucre made up of one or more rows of bracts, often with chaffy scales between the single flowers; heads solitary or clustered on the stems; herbs or shrubs, very variable as to leaves.

1. Heads rayless, with tube- or disk-flowers only
   a. Heads white, yellow, red, etc., not green and inconspicuous

(1) Heads large, rose-purple to cream-colored, usually with spiny bracts; leaves spiny; pappus hairy — CARDUUS
(2) Heads not large or spiny; leaves rarely spiny
(a) Flowers red or purple
x. Leaves in whorls of 3-5 — EUPATORIUM
y. Leaves alternate
(x) Heads in spikes or racemes — LACINIARIA
(y) Heads in flat-topped panicles — VERNONIA
(b) Flowers yellow, cream-colored or white
x. Pappus hairy
(x) Receptacle with chaffy scales among the flowers — FILAGO
(y) Receptacle without chaff
m. Shrubs
(m) Heads dioecious — BACCHARIS
(n) Heads perfect — TETRADYMIA
n. Herbs
(m) Heads white
r. Leaves large and arrow-shaped — PETASITES
s. Leaves not large and arrow-shaped
(r) Leaves opposite; involucre and leaves not woolly — EUPATORIUM
(s) Leaves alternate or basal; involucre and leaves more or less woolly
h. Heads dioecious
(h) Stems mostly low, with basal leaves — ANTENNARIA
(i) Stems tall and leafy — ANAPHALIS
i. Heads monoecious — GNAPHALIUM
(n) Heads cream-colored, yellow or yellowish
r. Flowers cream-colored
(r) Leaves more or less opposite; involucre bell-shaped — COLEANTHUS
(s) Leaves alternate; involucre oblong — KUHNIA

s. Flowers yellow
(r) Heads narrow, cylindric, few-flowered
h. Bracts of involucre in distinct vertical rows — CHRYSOTHAMNUS
i. Bracts of involucre not in vertical rows — ISOCOMA
(s) Heads broad, many-flowered
h. Bracts of involucre in 2-3 rows — HAPLOPAPPUS
i. Bracts in 1 row
(h) Leaves opposite — ARNICA
(i) Leaves alternate — SENECIO

y. Pappus not hairy, but of scales, awns or lacking
(x) Receptacle with chaffy scales among the flowers; pappus usually of 2-6 awns
m. Bracts of involucre separate — BIDENS
n. Inner bracts of involucre united into a cup — THELESPERM.
(y) Receptacle not chaffy
m. Pappus a crown, or none
(m) Pappus a fringed crown; leaves opposite, long-tailed — PERICOME
(n) Pappus a low, entire crown or none; leaves dissected
r. Pappus usually a crown — TANACETUM
s. Pappus usually none — MATRICARIA
n. Pappus of scales or awns
(m) Leaves entire or toothed
r. Leaves entire, mostly basal; involucre not sticky, the bracts in 2-3 rows — ACTINELLA
s. Leaves toothed, on the stem; involucre sticky, the bracts in several rows — GRINDELIA
(n) Leaves parted or dissected
r. Flowers yellow — BAHIA
s. Flowers yellowish or whitish

(r) Scales of the pappus 10-20 — HYMENOPAPPUS
(s) Scales of the pappus 4-14 — CHAENACTIS

b. Heads green or greenish-yellow, inconspicuous
(1) Leaves not lobed or divided
(a) Leaves opposite — IVA
(b) Leaves alternate
x. Fruit a spiny bur with 2 achenes — XANTHIUM
y. Achenes not in a bur
(x) Receptacle chaffy
m. Pappus of several scales — DICORIA
n. Pappus none — PARTHENICE
(y) Receptacle without chaff; pappus none — ARTEMISIA
(2) Leaves lobed to pinnatifid
(a) Some of the leaves opposite; spines of fruit in 1 row — AMBROSIA
(b) Leaves regularly alternate
x. Spines of fruit in several rows — FRANSERIA
y. Achenes not in a spiny fruit
(x) Bracts imbricated, not sharp-pointed — ARTEMISIA
(y) Bracts in one row, sharp-pointed — OXYTENIA

2. Heads with rays
a. Receptacle with chaffy scales among the disk-flowers
(1) Rays not yellow
(a) Rays white
x. Leaves finely dissected
(x) Rays 2-6 — ACHILLEA
(y) Rays 10-18 — ANTHEMIS
y. Leaves entire to pinnatifid
(x) Rays 4-9; pappus none — MELAMPODIUM
(y) Rays 8-13; pappus hairy — LAYIA
z. Leaves 2-3-pinnatifid into linear segments; involucre white-bordered — LEUCAMPYX
(b) Rays pink to purple; chaff spiny — BRAUNERIA
(2) Rays yellow
(a) Rays pistillate, i. e., with a style
x. Achene broadly winged; pappus of 2 awns — XIMENESIA
y. Achene scarcely or not at all winged
(x) Rays 2-5

m. Rays large and broad, 4-5; pappus of a few awns — Crassina
n. Rays small, 2-5; pappus none — Madia
(y) Rays 10 or more
m. Pappus none — Balsamorrhiza
n. Pappus present, a crown or teeth
(m) Leaves opposite; pappus a crown of 1-3 teeth — Heliopsis
(n) Leaves alternate; pappus a crown of 5-10 teeth — Wyethia
(b) Rays neutral, i. e., without a style
x. Disk globoid, conic or cylindric
(x) Pappus a 4-toothed crown, or if none, the disk purple-black
m. Achenes flattened; disk cylindric — Ratibida
n. Achenes 4-angled; disk globoid to conic — Rudbeckia
(y) Pappus inconspicuous or none; disk yellow — Gymnolomia
y. Disk convex to flat
(x) Involucral bracts in 2 distinct rows, often united into a cup
m. Pappus of 2-6 barbed awns — Bidens
n. Pappus not barbed
(m) Bracts of inner row united to middle or more — Thelesperma
(n) Bracts distinct or nearly so — Coreopsis
(y) Involucral bracts in several similar rows
m. Pappus of 2 scales or awns — Helianthus
n. Pappus of several scales between the awns — Helianthella
b. Receptacle not chaffy
(1) Pappus hairy
(a) Rays yellow
x. Leaves opposite
(x) Rays 1-4 cm. long — Arnica
(y) Rays 2-4 mm. long — Haploesthes
y. Leaves alternate
(x) Involucral bracts equal, in 1 row, often with small ones at base — Senecio

(y) Involucral bracts in 2-several rows
m. Heads broad, many-flowered; rays many
(m) Pappus bristles in 2 rows, the outer much shorter — CHRYSOPSIS
(n) Pappus bristles equal, in 1 row — HAPLOPAPPUS
n. Heads narrow, few-flowered; rays 3-20 — SOLIDAGO
(b) Rays not yellow
x. Pappus of many hair-like bristles
(x) Involucral scales usually in 1-2 rows; rays usually many, narrow
m. Rays longer than the width of the disk — ERIGERON
n. Rays tiny, not longer than the width of the disk — LEPTILUM
(y) Involucral scales usually in several rows; rays broad
m. Bracts in 2-5 rows, not spreading or reflexed as a rule — ASTER
n. Bracts in many rows, mostly spreading or reflexed — MACHAERANTHE.
y. Pappus of a few hair-like bristles or scales or both — TOWNSENDIA
(2) Pappus not hairy, but of scales, awns, etc., or none
(a) Rays yellow
x. Ray 1; leaves opposite; pappus none — FLAVERIA
y. Rays more than 1
(x) Achenes 4-angled
m. Plants permanently densely woolly — ERIOPHYLLUM
n. Plants not densely woolly, or only when young
(m) Plants sticky-hairy — HULSEA
(n) Plants not sticky-hairy
r. Leaves entire — PLATYSCHKUHRIA
s. Leaves parted or divided — BAHIA
(y) Achenes 5-10 ribbed
m. Receptacle with bristles among the disk-flowers; pappus of 5-10 pointed scales — GAILLARDIA

n. Receptacle without bristles
(m) Leaves alternate or basal, usually without glands
r. Involucral scales spreading or reflexed; stems 2-6 ft. high HELENIUM
s. Involucral scales not spreading or reflexed; stems less than 2 ft. high as a rule
(r) Involucre densely woolly; leaves parted or divided; alpine RYDBERGIA
(s) Involucre not densely woolly; leaves entire or if divided, not alpine ACTINELLA
(n) Leaves usually opposite, with distinct oil-glands
r. Leaves entire, narrow PECTIS
s. Leaves divided DYSODIA
(z) Achenes flattened, roundish or swollen, sometimes striate
m. Heads small, disk-flowers 1-12; rays 1-10
(m) Rays 2-3-lobed, 4-15 mm. long PSILOSTROPHE
(n) Rays not lobed, 1-2 mm. long GUTIERREZIA
n. Heads large, disk- and ray-flowers many; involucres gummy GRINDELIA
(b) Rays white to purple
x. Marginal flowers not true rays, merely ray-like CHAENACTIS
y. Marginal flowers true rays
(x) Rays rose-purple POLYPTERIS
(y) Rays white CHRYSANTHEMUM

3. Heads with all the flowers ray-like or strap-shaped, the central sometimes imperfect and closed; typically with milky juice
a. Pappus of blunt scales; flowers blue CICHORIUM
b. Pappus of plumy, hair-like bristles or bristle-like scales
(1) Achenes with a beak, bristles interwoven TRAGOPOGON
(2) Achenes not beaked
(a) Flowers pink; pappus plumy PTILORIA

(b) Flowers yellow; pappus of narrow scales
x. Bracts of involucre in 1 row — ADOPOGON
y. Bracts in 2 or more rows
(x) Pappus scales tipped with a plumy bristle — PTILOCALAIS
(y) Pappus scales bristle-like — NOTHOCALAIS
c. Pappus of hair-like bristles which are not plumose
(1) Pappus in 2 rows, the inner deciduous and falling together, the outer 1-8 and persistent — MALACOTHRIX
(2) Pappus persistent or the bristles falling separately
(a) Flowers rose to purple
x. Stems annual, 4-8 in. high — PRENANTHELLA
y. Stems perennial, usually a foot or more high
(x) Leaves few or none — LYGODESMIA
(y) Leaves many — PRENANTHES
(b) Flowers yellow, blue or white
x. Stems leafless; heads solitary
(x) Achenes spiny-warted about the top — TARAXACUM
(y) Achenes not spiny-warted — AGOSERIS
y. Stems leafy; heads usually several-many
(x) Achenes flattened
m. Achenes broad at top, not beaked — SONCHUS
n. Achenes narrowed at top or beaked — LACTUCA
(y) Achenes not flattened
m. Pappus white — CREPIS
n. Pappus not white, dark or brownish — HIERACIUM

ADOPÓGON Necker 1790 GOATSBEARD
(Gr. *hados*, pleasing *pogon*, beard)
(Krigia Schreber)

Heads with yellow or orange perfect strap-flowers, achenes oblong, ribbed, pappus of an outer row of 10-15 scales and an inner row of hair-like bristles; receptacle flat, without chaff, involucre bell-shaped, bracts in 1-2 rows; heads solitary; leaves alternate or basal, entire to pinnatifid; annual or perennial.

Stems 1-2 ft. high, 1-leaved; heads about 1.5 in. wide *A. virginicus*

ACHILLÉA Linné 1753 MILFOIL, YARROW
(Named for Achilles)

Heads with white or pink pistillate ray flowers, disk flowers yellow, perfect, achenes oblong or obovate, slightly flattened, pappus none; receptacle flat or convex, with chaff, involucre bell-shaped, the bracts imbricated in several rows; heads in flat-topped corymbs; leaves alternate, finely dissected; perennial.

Stems 1 in. to 3 ft. high; leaves finely dissected, 1-10 in. long; rays 4-6, white to rose — *A. millefólium*

ACTINÉLLA Nuttall 1818
(Gr. *aktis, aktinos,* ray)
(Hymenoxys Cassini; Tetraneuris Greene)
Pl. 40, fig. 6; Pl. 41, fig. 2.

Heads with yellow ray flowers, rarely rayless, ray-flowers pistillate, 3-toothed, disk flowers perfect, yellow to brownish, achenes top-shaped, 5-10-ribbed or angled, usually hairy, pappus of 5-12 usually pointed scales; receptacle convex to conic, without chaff, involucre bell-shaped or hemispheric, bracts imbricated in 2-3 rows; heads single or clustered; leaves alternate or basal, often dotted with glands; stemmed or stemless, annual or perennial.

1. Leaves entire
   a. Stems with 1-4 leaves in addition to those at the base — *A. leptóclada*
   b. Stems leafless, the leaves all basal, smooth to variously hairy — *A. acaúlis*
2. Leaves ternately cut into linear lobes
   a. Perennial from a branched caudex; heads solitary to many — *R. richardsóni*
   b. Annual from a tap root — *A. multiflóra*

AGÓSERIS Rafinesque 1817
(Gr. *aix, agos,* goat, *seris,* chicory)
(Troximon Nuttall)
Pl. 37, fig. 4.

Heads with yellow, orange or purple strap-shaped perfect flowers, the tip 5-toothed, achenes oblong to linear or obovate, 10-ribbed with a short or long beak, pappus of white, hair-like bristles; receptacle flat, involucre bell-shaped or oblong, the bracts imbricated in several rows; heads solitary on leafless stalks; leaves simple to pinnatifid; annual or perennial.

1. Heads yellow, the rays occasionally purplish outside or when old

PLATE 37

ASTER FAMILY

1. Laciniaria punctata: Blazing Star
2. Lactuca pulchella: Blue Lettuce
3. Coleanthus grandiflorus
4. Agoseris glauca
5. Tragopogon porrifolius: Salsify
6. Carduus undulatus: Thistle
7. Crepis runcinata

1
2
3
4
5
6
7

a. Achene 3-4 mm. long, with a thread-like beak 10-15 mm. long *A. grandiflóra*
b. Achene 7-12 mm. long, with a short stout beak 1-4 mm. long *A. glaúca*

2. Heads orange to purple; achene 6-8 mm. long, with a thread-like beak 5-10 mm. long *A. aurantíaca*

Ambrósia Linné 1753 Ragweed, Kinghead
(The Latin name)

Heads without rays, monoecious, achenes ovoid or obovoid, pappus none, involucre closed, usually with 4-8 tubercles or spines, staminate heads open, many-flowered, corolla present, involucre 5-12-lobed, heads spiked or racemed, pistillate heads 1-flowered, without corolla, solitary or clustered; leaves alternate or opposite, lobed or divided; annual or perennial.

1. Leaves digitately 3-5-lobed; stems 3-15 ft. high *A. trífida*
2. Leaves 1-3-pinnatifid; stems 1-5 ft. high
   a. Fruiting involucre with 4-6 spines about the summit; annual *A. artemisifólia*
   b. Fruiting involucre spineless or with 3-4 tubercles; perennial by rootstocks *A. psilostáchya*

Anáphalis DeCandolle 1837 Pearly Everlasting
(Greek name of some plant)

Heads without rays, dioecious, staminate and pistillate flowers with corolla and hair-like pappus, achenes oblong; receptacle convex without chaff, involucre oblong to bell-shaped, the bracts papery, pearly white, imbricated in several rows; heads in corymbs; leaves alternate, entire, white-woolly; perennial.

Stems 1-2 ft. high; leaves 2-5 in. long, lance-linear, green above, woolly below; heads 6 mm. high *A. margaritácea*

Antennária Gaertner 1791 Catsfoot
(Lat. *antenna*, feeler)
Pl. 38, fig. 2.

Heads without rays, usually dioecious, staminate and pistillate flowers with hair-like pappus, achenes oblong, round or somewhat flattened; receptacle convex or flat without chaff, involucre oblong to bell-shaped, usually woolly, the bracts papery, imbricated in several rows; heads in dense clusters, corymbs or racemes; leaves alternate, basal, mostly entire, woolly; perennial.

1. Plants with stolons, forming mats
   a. Heads in a dense head-like cluster
      (1) Involucres brown, greenish-brown or brownish — *A. alpína*
      (2) Involucres white or pink, greenish at base
         (a) Involucres 4-6 mm. high
            x. Basal leaves obovate to spatulate, densely silvery-white, 1-1.5 cm. long — *A. dioéca*
            y. Basal leaves narrowly lanceolate or oblanceolate, greenish-silvery, 2-3 cm. long — *A. corymbósa*
         (b) Involucres 7-10 mm. high; leaves spatulate to obovate — *A. áprica*
   b. Heads in an open raceme-like cluster — *A. racemósa*
2. Plants in tufts, or single, without stolons
   a. Heads solitary; stems tufted, 1-2 in. high; leaves spatulate, 1-3 cm. long — *A. dimórpha*
   b. Heads in a corymb-like or head-like cluster; stems .5-2 ft. high; leaves linear to lanceolate or oblanceolate, 2-10 cm. long — *A. carpáthica*

Anthemis Linné 1753 Mayweed
(Gr. *anthemis*, flower)

Heads with white, neutral or pistillate ray-flowers, disk-flowers yellow, perfect, achenes oblong, 10-angled, 10-ribbed, roughened, pappus none or a short border; receptacle convex to oblong, with chaff, involucre hemispheric, bracts with papery margins, imbricated in several series; heads at the ends of the branches; leaves alternate, pinnatifid or dissected, strong-scented; annual or perennial.

Stems .5-2 ft. high; leaves finely dissected — *A. cótula*

Árnica Linné 1753 Arnica
(Origin and meaning uncertain)
Pl. 40, fig. 2.

Heads with yellow ray-flowers, the latter sometimes wanting, ray-flowers pistillate, entire, or 2-3-toothed, disk-flowers yellow, perfect, achenes linear, 5-10-ribbed, pappus a single row of barbed, hair-like bristles; receptacle flat without chaff, involucre bell-shaped or top-shaped, bracts nearly equal in 1-2 series; heads solitary or few in a corymb; leaves mostly opposite, simple, entire or toothed; perennial.

1. Basal leaves, and often some stem leaves, deeply heart-shaped, densely hairy to smooth or nearly so — *A. cordifólia*
2. Leaves not cordate
   a. Stem leaves usually 4-8 pairs
      (1) Leaves lance-ovate to lanceolate or oblong, acute or blunt at tip, 2-3 in. long — *A. chamissónis*
      (2) Leaves long lanceolate, 3-6 in. long, tapering into a point 1-2 in. long — *A. longifólia*
   b. Stem leaves 1-3 pairs, upper pair usually bract-like
      (1) Heads without rays, usually 3-13; leaves lance-ovate to lanceolate — *A. párryi*
      (2) Heads with rays, single or 2-3; leaves ovate to lanceolate — *A. alpína*

ARTEMÍSIA Linné 1753 WORMWOOD, SAGEBRUSH
(Named for Artemisia, wife of Mausolus)

Heads without ray-flowers, the disk-flowers all perfect and fertile, or the central ones sometimes sterile, the marginal ones pistillate and fertile, achenes obovate to oblong, pappus none; receptacle flat to hemispheric, without chaff, involucre oblong to hemispheric, the bracts imbricated in a few rows; heads variously clustered, the flowers greenish or yellow; leaves alternate, entire to divided, often woolly; herbs or shrubs.

1. Stems spiny; achenes cobwebby with long hairs; leaves digitately 3-5-parted — *A. spinéscens*
2. Stems not spiny; achenes not cobwebby
   a. Stems shrubby, 5 in. to 10 ft. high
      (1) Leaves entire, linear to lance-linear, densely white-hairy; stems 1-2.5 ft. high — *A. cána*
      (2) Leaves 3-toothed or 3-cleft
         (a) Leaves wedge-shaped, 3-toothed or 3-lobed at the tip, uppermost entire
            x. Stems usually 1-10 ft. high; flower cluster much branched; heads 2 mm. wide — *A. tridentáta*
            y. Stems 4-10 in. high; flower cluster narrow, spike-like; heads 3 mm. wide — *A. arbúscula*
         (b) Leaves 3-cleft into thread-like lobes, the upper entire and thread-like
            x. Leaves 1-2 cm. long, lobes 3-10 mm. long; heads oblong, 2 mm. wide — *A. trífida*

y. Leaves 1-2 in. long, lobes 1 in. or more long; heads round, 1 mm. wide — *A. filifólia*

b. Stems herbaceous, occasionally woody at the base

(1) Leaves entire or coarsely 3-5-lobed

(a) Leaves entire, linear, green; involucres green, 2-3 mm. wide; heads many in a long panicle — *A. dracunculoides*

(b) Leaves entire to coarsely and irregularly 3-5-lobed, felted on both faces, or green above; involucres white or gray, felted, woolly or hairy — *A. ludoviciána*

(2) Leaves, at least the lower, regularly 5-7-lobed or pinnatifid to finely dissected

(a) Long woolly hairs between the flowers; leaves usually gray-hairy

x. Heads many, 3-5 mm. wide; leaves short, finely dissected; stems 6-18 in. high, usually mat-like; at 3-9000 ft. — *A. frígida*

y. Heads 1 to about 10, 5-12 mm. wide, often nodding; leaves longer, pinnatifid; stems 1-10 in. high, clustered or single; at 10-13000 ft. — *A. scopulórum*

(b) No long woolly hairs between the flowers of the head

x. Leaves smooth, green at least above

(x) Stems from a caudex or woody base

m. Leaf segments linear to thread-like — *A. canadénsis*

n. Leaf segments broad, lanceolate to oblong

(m) Leaves mostly 1-pinnatifid; heads 20-30-flowered — *A. díscolor*

(n) Leaves mostly 2-pinnatifid; heads 30-40 flowered — *A. franserioídes*

(y) Stems merely from a tap root, biennial; leaf segments toothed as a rule — *A. biénnis*

y. Leaves more or less gray-hairy

(x) Heads many in a large panicle — *A. canadénsis*

(y) Heads fewer in a narrow spike-like cluster
m. Stems and involucres white-felted *A. wrighti*
n. Stems and involucres hairy to smooth *A. boreális*

ÁSTER Linné 1753 ASTER
(Gr. *aster*, star)
Pl. 38, fig. 5.

Heads with white, pink, blue, violet or purple pistillate ray-flowers, disk-flowers yellow, becoming brown, purple or red, perfect, achenes usually flattened and nerved, pappus of hair-like bristles; receptacle flat to convex, without chaff, involucre hemispheric to top-shaped, the bracts usually unequal and imbricated in several rows, sometimes about equal and in 2-3 rows; heads solitary or in corymbs or panicles; leaves alternate, simple; perennial or rarely annual.

1. Annuals
   a. Bracts linear or linear-lanceolate, pointed *A. angústus*
   b. Bracts oblong to oblanceolate, blunt or rounded *A. frondósus*
2. Perennials
   a. Bracts spiny-pointed; stems tufted, 1-headed
      (1) Leaves not spiny-toothed, spatulate or oblanceolate; heads 10-15 mm. wide; rays white *A. villósus*
      (2) Leaves spiny-toothed, spatulate; heads 10-12 mm. high; rays purple *A. coloradénsis*
   b. Bracts not spiny-pointed
      (1) Bracts broad with keel-like midrib, papery, usually fringed and purple-tipped
         (a) Involucres 12-20 mm. wide; leaves mostly 1.5-2.5 cm. wide *A. engelmánni*
         (b) Involucres 6-10 mm. wide; leaves usually less than 1 cm. wide
            x. Stems usually simple; bracts purple, acute *A. élegans*
            y. Stems usually much branched; bracts scarcely purple, outer rounded or blunt
      (2) Bracts mostly narrow, without keel-like midrib *A. glaúcus*

(a) Stems 1-headed, 2-4 in. high; leaves linear to spatulate; rays white to violet; at 10-14000 ft.
  x. Stems erect; basal leaves usually none; stem leaves many, crowded, gray-hairy, spiny-tipped, less than 1 cm. long; heads 6-12 mm. wide; rays 10-12 mm. long, violet — *A. alpínus*
  y. Stems spreading; basal leaves many, green, 3-9 cm. long; stem leaves few or none; heads 12-18 mm. wide; rays 12-16 mm. long, purple — *A. pulchéllus*
(b) Stems usually few-many-headed, .5-6 ft. high; at 3-900 ft.
  x. Involucres and peduncles glandular-hairy
    x) Stem leaves linear, or lance-linear, 1-5 mm. wide
      m. Involucre 4-5 mm. high; rays 4-5 mm. long, violet — *A. pauciflórus*
      n. Involucre 5-8 mm. high; rays 8-15 mm. long
        (m) Rays violet, 8 mm. long — *A. féndleri*
        (n) Rays deep blue, 12-15 mm. long — *A. campéstris*
    (y) Stem leaves lanceolate or oblong to ovate, .5-6 cm. wide
      m. Leaves ovate to lance-ovate, coarsely sharp-toothed, 2-6 cm. wide, involucre 10-12 mm. high; rays violet — *A. conspícuus*
      n. Leaves oblong to spatulate, entire
        (m) Stems 1-2 ft. high; rays 15-30
          r. Rays 15-25, blue-purple; involucre 8-12 mm. high; heads few; leaves spatulate — *A. integrifólius*
          s. Rays 25-30, violet; involucre 4-6 mm. high; heads many; leaves lance-oblong — *A. oblongifólius*
        (n) Stems 2-6 ft. high; rays 50-70, purple; involucre 8-12 mm. high; leaves lance-oblong — *A. novae-ángliae*

y. Involucres and peduncles not glandular-hairy
(x) Outer bracts as long or longer than the inner, often leaf-like — *A. foliáceus*
(y) Outer bracts shorter than the inner, not leaf-like
m. Bracts more or less hairy on the back
(m) Stems 2-6 in. high; leaves bristly ciliate, less than 1 cm. long; heads single at the end of each branch, 1-1.5 cm. wide; rays white, 12-15 — *A. ericoides*
(n) Stems 1-4 ft. high, leaves somewhat ciliate, 1-5 cm. long; heads not single on the branches
r. Bracts pointed with a short white bristle; heads usually many in a panicle; involucre 4-8 mm. high; rays mostly white, sometimes bluish — *A. multiflórus*
s. Bracts not bristle-pointed; heads few in a cyme-like cluster; rays violet — *A. gríseus*
n. Bracts smooth on the back
(m) Stems and peduncles smooth
r. Rays white; leaves linear or lance-linear; stems 1-2 ft. high
(r) Heads few-several in a flat-topped cluster; stems simple — *A. ptarmicoides*
(s) Heads many in a panicle; stems much branched — *A. pórteri*
s. Rays lilac to blue-purple; leaves lance-oblong to spatulate or ovate, upper with clasping base; stems 1-5 ft. high — *A. lévis*

PLATE 38

ASTER FAMILY

1. Solidago missouriensis: Goldenrod
2. Antennaria dioeca: Catsfoot
3. Erigeron macranthus: Daisy
4. Machaeranthera bigelovi: Purple Aster
5. Aster foliaceus
6. Gutierrezia sarothrae
7. Chrysopsis villosa: Golden Eye
8. Grindelia squarrosa: Gum Weed

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(n) Stems and peduncles hairy, or at least with hairy lines
r. Lower leaves ovate and heart-shaped, long-petioled; rays blue to violet — *A. lindleyánus*
s. Leaves lanceolate, spatulate to linear
(r) Lower leaves spatulate or oblong-spatulate; heads mostly few-several, in flat-topped clusters — *A. adscéndens*
(s) Leaves lanceolate to linear
h. Bracts of 1-2 different lengths; rays violet to purple — *A. longifólius*
i. Bracts of 3-5 different lengths; rays often white — *A. salicifólius*

BÁCCHARIS Linné 1753
(Named for Bacchus)

Heads without rays, dioecious, achenes ribbed, somewhat flattened, pappus of hair-like bristles, shorter in the staminate flowers; receptacle flat without chaff, involucre bell-shaped, the bracts imbricated in several rows; heads in panicles or corymbs; leaves alternate, simple; herbs or shrubs.

1. Stems herbaceous, except for a woody base
a. Leaves linear, entire; pappus elongating in fruit, 4 times as long as the 8-10-ribbed achene — *B. wrighti*
b. Leaves long-lanceolate, somewhat toothed; pappus little elongated in fruit; achene 5-ribbed — *B. glutinósa*
2. Shrubs, 3-10 ft. high
a. Pistillate heads 5-10 mm. broad; involucral bracts all acute
b. Pistillate heads 3-5 mm. broad; outer bracts obtuse — *B. emóryi*

BÁHIA Lagasca 1816 BAHIA
(Named for Bahi, a Spanish botanist)
Pl. 41, fig. 1.

Heads with yellow pistillate ray-flowers or none, disk-flowers perfect, yellow, achenes linear to oblong, 4-angled, pappus of several papery scales;

receptacle flat, without chaff, involucre bell-shaped or hemispheric, the bracts nearly equal, in 1-2 rows; heads solitary or in corymbs; leaves opposite or alternate, parted or divided; annual or perennial.

1. Perennial from a woody root; rays 5-6, short; leaves 3-5 parted — *B. oppositifólia*
2. Annual
   a. Rays present; leaves mostly alternate — *B. dissécta*
   b. Rays none; leaves mostly opposite — *B. neo-mexicána*

Balsamorrhíza Hooker 1833 Balsam Root

(Gr. *balsamon*, balsam, *rhiza*, root)

Heads with yellow ray-flowers, disk-flowers yellow, perfect, achenes of the ray-flowers 3-angled or flattened, of the disk-flowers 4-angled; receptacle flat or convex with lance-linear chaff, involucre broad, the bracts imbricated or nearly equal and the outer enlarged; heads mostly solitary on few-leaved or naked stalks; leaves large, mostly basal, simple to pinnatifid; perennial.

1. Leaves entire or toothed — *B. sagittáta*
2. Leaves, or some of them, pinnatifid
   a. Stems and leaves smooth or slightly hairy — *B. macrophýlla*
   b. Stems and leaves white-hairy to woolly — *B. incána*

Bídens Linné 1753 Beggar's Ticks, Bur-marigold

(Latin *bi-*, two, *dens*, tooth, from the pappus)

Pl. 40, fig. 1.

Heads with white or yellow neutral rays or none, disk-flowers perfect, yellow to brown, achenes flat, angled or rounded, wedge-shaped to linear, pappus of barbed awns; receptacle flat, with chaff, involucre bell-shaped to hemispheric, bracts in 2 rows, separate or somewhat united at the base, the outer often larger and leaf-like; heads solitary or in corymbs or panicles; leaves opposite, or alternate above, toothed, lobed or dissected; annual or perennial.

1. Leaves simple, toothed
   a. Rays present — *B. lévis*
   b. Rays none — *B. comósa*
2. Leaves, or some of them, divided or dissected
   a. Rays none; achenes oval to obovate, flat, 2-awned — *B. frondósa*
   b. Rays present; achenes long-linear, angled, 2-4-awned

(1) Leaf-segments linear; achenes 2-awned *B. tenuisécta*
(2) Leaf-segments triangular to oblong; achenes 3-4-awned *B. bipinnáta*

BRAUNERIA Necker 1790
(Named for Brauner, a German botanist)

Heads with pink to rose-purple neutral rays, disk-flowers perfect, brown, achenes 4-sided, pappus a crown of teeth; receptacle conic, with stiff pointed chaff, involucre hemispheric, the bracts imbricated in 2-4 rows; heads solitary on long stalks; leaves alternate or opposite, entire or toothed; perennial.

Stems bristly, 1-3 ft. high; leaves lanceolate, 3-8 in. long; rays 10-20, 1-2.5 in. long *B. pállida*

CÁRDUUS Linné 1753 THISTLE
(The Latin name of the thistle)
Pl. 37, fig. 6.

Heads without rays, rarely dioecious, disk-flowers with long, deeply-cleft corolla tube, perfect as a rule, achenes oblong to obovate, flattened or 4-angled, pappus of several rows of hair-like bristles; receptacle flat or convex, bristly, involucre ovoid to globose, the bracts usually imbricated in many rows and spiny-tipped; heads large, solitary or clustered; leaves alternate or basal, toothed to pinnatifid, usually spiny; biennial or perennial.

1. Heads 1.5-3 in. high, perfect
   a. All the bracts, or at least the inner ones, with broadened fringed tips; flowers yellow or yellowish
      (1) All the bracts with broadened fringed tips, not cobwebby, the spines short or none; leaves green above, white-felted below *C. americánus*
      (2) Inner bracts with broadened fringed tips, outer with spines 5-10 mm. long
         (a) Leaves green and smooth when mature, oblong-ovate; bracts cobwebby *C. párryi*
         (b) Leaves green and hairy or white below, long and narrow; bracts not cobwebby *C. drummóndi*
   b. None of the bracts with broadened fringed tips; white, yellow or purple
      (1) Bracts without a sticky ridge or line on the back

(a) Bracts more or less densely cobwebby, not imbricated in rows; heads yellowish; leaves white-woolly to nearly smooth — *C. hookeriánus*

(b) Bracts not cobwebby

x. All bracts tipped with spines, cottony; heads dark purple; weeds — *C. lanceolátus*

y. Inner bracts, and sometimes the outer also, pointed but not spiny; heads white to rose-purple

(x) Bracts spreading or reflexed, densely white-woolly; leaves densely white-woolly — *C. neo-mexicánus*

(y) Bracts not spreading or reflexed, or at the tips only; bracts not densely white-woolly; stem simple, branched or none — *C. drummóndi*

(2) Bracts with a sticky ridge, line or spot on the back, closely imbricated in several rows

(a) Heads yellowish or yellow — *C. platténsis*

(b) Heads rose to purple, rarely white — *C. undulátus*

2. Heads less than 1 in. high, dioecious; weed — *C. arvénsis*

CHAÉNACTIS DeCandolle 1836

(Gr. *chaino,* to gape, *actis,* ray, from the enlarged throat of the corolla)

Heads without rays, but the marginal flowers somewhat enlarged, often simulating rays, disk-flowers yellow, white or purplish, achenes linear, 4-angled or flattened, pappus of scales; receptacle flat, without chaff, involucre bell-shaped to hemispheric; heads solitary or in cymes; leaves alternate, usually pinnately-dissected; annual or perennial.

1. Marginal flowers manifestly enlarged, becoming unequally 5-lobed or ray-like; pappus of 4 scales. — *C. stevioídes*

2. Marginal corollas not enlarged and irregular; pappus of 8-14 scales — *C. douglási*

CHRYSÁNTHEMUM Linné 1753 OX-EYE DAISY, WHITE WEED

(The Greek name, meaning Golden Flower)

Heads with white pistillate rays, disk-flowers yellow, perfect, achenes roundish or angled, 5-10-ribbed, pappus none or a cup of scales; receptacle

flat to hemispheric without chaff, involucre hemispheric, bracts imbricated in several rows; heads usually solitary on long stalks; leaves alternate, coarsely toothed or cut; annual or perennial.

Stems 1-3 ft. high; stem-leaves linear-spatulate, 1-3 in. long; rays 20-30 *C. leucánthemum*

CHRYSÓPSIS Nuttall 1818 GOLDEN EYE, GOLDEN ASTER
(Gr. *chrysos*, golden, *opsis*, look, from the color)
Pl. 38, fig. 7.

Heads with yellow pistillate ray-flowers, disk-flowers yellow, usually perfect, achenes flattened, linear-oblong to obovate, pappus double, inner row of hair-like bristles and the outer of smaller scales or bristles; receptacle flat, without chaff, involucre hemispheric to bell-shaped, the bracts imbricated in several rows; heads solitary or corymbose on the branches; leaves alternate, sessile, entire or toothed; perennial.

Stems 4 in. to 2 ft. high; leaves lance-linear to spatulate or nearly ovate, 1-8 cm. long, bristly, shaggy hairy or sticky; heads 1-2 cm. wide, sessile or variously stalked *C. villósa*

CHRYSOTHÁMNUS Nuttall 1840 GOLDEN BUSH, FALSE GOLDEN ROD
(Gr. *chrysos*, golden, *thamnos*, bush)

Heads without rays, the disk-flowers yellow or cream-colored, perfect, achenes oblong to ovoid, pappus of hair-like bristles; receptacle without chaff, involucre oblong to cylindric, the bracts imbricated in several rows, often in distinct vertical ridges, usually stiff and papery; heads in racemes, panicles or cymes; leaves alternate, entire, spatulate to linear; shrubs, or becoming shrubby.

1. Bracts more or less long-pointed
   a. Achenes hairy; bracts not in ridges
      (1) Outer bracts long-tapering, some usually exceeding the flowers, and leaf-like; heads in a long leafy spike- or raceme-like cluster
         (a) Heads 10-15-flowered; bracts about 12; leaves lance-linear *C. párryi*
         (b) Heads 5-flowered; bracts 15-18; leaves narrowly linear *C. hówardi*

(2) Outer bracts not exceeding the flowers or leaf-like; leaves thread-like, green and smooth — *C. greénei*

b. Achenes smooth; bracts keeled, in 5 distinct vertical ridges

(1) Leaves spatulate or oblanceolate, gray-hairy — *C. depréssus*

(2) Leaves narrowly linear to thread-like

(a) Bracts thick, strongly keeled, smooth — *C. pulchéllus*

(b) Bracts thin, not strongly keeled, cobwebby-ciliate — *C. bigelóvi*

2. Bracts not long-pointed, obtuse to acute

a. Achenes hairy

(1) Branches, at least the young ones more or less white-woolly or felted; bracts smooth, ciliate or hairy; leaves linear to lance-oblong — *C. nauseósus*

(2) Branches green, never woolly or felted; bracts smooth to ciliate; leaves linear to lance-oblong — *C. viscidiflórus*

b. Achenes not hairy — *C. váseyi*

Cichórium Linné 1753 Chicory
(Latinized from the Arabic)

Heads with strap-shaped flowers alone, the latter perfect, blue, rarely white, achenes 5-angled or ribbed, not beaked, pappus of 2-3 rows of short scales; receptacle flat, without chaff, involucre of 2 rows of bracts, the outer spreading; heads usually 1-4 in sessile clusters; leaves alternate and basal, entire to piniatifid; perennial with milky juice.

Stems 1-3 ft. high; basal leaves 3-6 in. long, spatulate, pinnatifid; heads 1-1.5 in. wide — *C. íntybus*

Coleánthus Cassini 1817 Thoroughwort
(Gr. *koleos*, sheath, *anthos*, flower)
Pl. 37, fig. 3.

Heads with tube-flowers alone, the latter white to yellowish, perfect, achenes 10-ribbed, oblong, pappus of hair-like bristles, receptacle flat or convex without chaff, involucre oblong to bell-shaped, the bracts imbricated in several rows; heads in panicles or cymes; leaves opposite or alternate, simple, toothed; perennial.

1. Leaves ovate or oblong-ovate, often heart-shaped at base

a. Leaves sessile or nearly so, the teeth spiny-pointed — *C. atractyloides*
b. Leaves petioled, the teeth not spiny-tipped
(1) Heads 10-25-flowered
(a) Leaves 2-4 cm. long; involucral bracts erect, not spreading — *C. wrighti*
(b) Leaves 5-10 mm. long; involucral bracts spreading and reflexed — *C. microphýllus*
(2) Heads 30-50-flowered
(a) Heads drooping — *C. grandiflórus*
(b) Heads erect — *C. ámbigens*
2. Leaves lance-oblong to linear, sessile; heads 40-50-flowered — *C. linifólius*

Coreópsis Linné 1753 Tickseed

(Gr. *koris,* tick, *opsis,* look, from the form of the achene)

Heads with yellow to brown neutral ray-flowers, disk-flowers yellow, perfect, achenes flat, oblong to rounded, often winged, pappus of 2 short teeth or none; receptacle flat, with chaff, involucre hemispheric, the bracts in 2 distinct rows, united at the base, the outer row usually narrower and shorter; heads solitary or in corymbs; leaves opposite or alternate, entire to pinnately divided; annual or perennial.

1. Rays brown at the base or brown all over; leaves 1-2-pinnately divided into linear segments — *C. tinctória*
2. Rays bright yellow; leaves spatulate or oblong, entire — *C. lanceoláta*

Crassína Scepin 1758 Zinnia

(Named for Crassus, an Italian botanist)

Heads with yellow or yellowish pistillate rays, becoming papery and persistent, disk-flowers yellow, perfect, achenes flattened, usually wingless, pappus of 2-4 erect awns; receptacle conic, with chaff, involucre bell-shaped to cylindric, the bracts papery, imbricated in several rows; heads solitary on the branches; leaves opposite, entire, sessile; annual or perennial.

Stems 6-12 in. high; leaves linear or lance-linear, 1-3 cm. long; rays 4-5, 10-16 mm. long — *C. grandiflóra*

Crépis Linné 1753 Hawksbeard

(Gr. *krepis,* sandal, perhaps from the basal leaves)

Pl. 37, fig. 7.

Heads of strap-shaped yellow or orange perfect flowers, achenes linear-oblong, 10-20-ribbed, not beaked, pappus of hair-like white bristles; receptacle flat, without chaff, involucre ovoid to cylindric, the main bracts in

1 row with shorter basal ones; heads in panicles or corymbs; leaves alternate or basal, entire to pinnatifid; annual or perennial.

1. Stems none or 4-10 in. high; heads very many, the involucre 6-8 mm. long, 2-3 mm. wide; achenes broadened at the tip into a disk
   a. Stemless or nearly so, the tufts from creeping rootstocks — *C. nána*
   b. Stems 4-10 in. high from a tap root — *C. élegans*
2. Stems 1-3 ft. high; heads few-many; achenes not broadened into a disk
   a. Stems and leaves smooth or glaucous, occasionally with coarse hairs, not finely gray-hairy; leaves mostly entire or with coarse teeth, rarely deeply pinnatifid
      (1) Involucres and peduncles smooth — *C. glaúca*
      (2) Involucres and peduncles coarsely hairy, the latter often woolly — *C. runcináta*
   b. Stems and leaves gray-hairy to woolly; leaves usually deeply pinnatifid
      (1) Involucres narrow, 1 cm. or less long, 2-3 mm. wide, smooth, except for the woolly-edged bracts at the base; inner bracts 5-8; flowers 5-8 — *C. acumináta*
      (2) Involucres 1-2 cm. long, 4-6 mm. wide, gray-hairy or woolly; inner bracts 9-24; flowers 10-30 — *C. occidentális*

Dicória Torrey and Gray 1848

(Gr. *di-*, twice, *koris*, bug, from the two achenes)

Heads without rays, with 1-2 pistillate flowers without corolla and 6-12 staminate ones, achenes oblong, margined with teeth, pappus small of several little scales; receptacle flat, chaff of 2 narrow scales, involucre of 5 leafy bracts; heads in a sparse panicle, some all staminate; leaves alternate, at least above, usually entire; annual.

Leaves lance-oblong to spatulate, 2-3 cm. long; pistillate flowers solitary in the head — *D. brandégei*

Dysódia Cavanilles 1801 Dysodia

(Gr. *dysodia*, ill-smelling)

(Hymenatherum Cassini; Lowellia Gray)

Pl. 41, fig. 6.

Heads with yellow pistillate ray-flowers, disk-flowers perfect, yellow, achenes 3-5-angled, pappus of 6-10 scales, toothed or fringed with hair-

like bristles; receptacle flat, hairy or bristly, involucre hemispheric to cylindric, the bracts in 1 series, more or less united; heads solitary or somewhat panicled; leaves alternate or opposite, pinnately parted or dissected; annual.

1. Leaves mostly opposite, strong-scented; rays usually 2-5, 3-4 mm. long — *D. pappósa*
2. Leaves mostly alternate, not strong-scented; rays about 12, 6 mm. long — *D. aúrea*

ERÍGERON Linné 1753 DAISY

(Gr. *er*, spring, *geron*, old man, from the woolly heads and time of blooming)

(Wyomingia Nelson)

Pl. 38, fig. 3.

Heads with white, violet or purple pistillate ray-flowers, disk-flowers yellow, perfect, achenes flattened, usually 2-nerved, pappus of hair-like bristles in 1-2 rows; receptacle flat, without chaff, involucre hemispheric to bell-shaped, the bracts nearly equal in 1-2, rarely 3-4 rows; heads solitary or in corymbs or panicles; leaves alternate or basal, entire to pinnatifid; annual or perennial.

1. Rays inconspicuous, short or wanting, usually erect; leaves entire
   a. Heads in a flat-topped corymb or panicle — *E. ácris*
   b. Heads in a narrow raceme — *E. a. racemósus*
2. Rays conspicuous, spreading or flat; leaves various
   a. Bracts of the involucre in 1-2 nearly equal rows
      (1) Perennial, as shown by old stems, runners, rootstocks, caudexes, etc.
         (a) Stems spreading by runners, 2-10 in. high; leaves linear to spatulate; rays white, rose or purplish — *E. flagelláris*
         (b) Stems without runners
            x. Leaves basal, deeply divided or cleft 1-3-ternate, 3-5-fid or pinnatifid; stems tufted, 2-8 in. high; heads 1-1.5 cm. wide; rays white to blue-purple — *E. compósitus*
            y. Leaves entire or toothed
               (x) Involucres copiously white or black cobwebby-woolly, especially at base

leaves mostly basal, stem leaves small; rays white to blue

n. Stems 6-15 in. high, clustered, very leafy; leaves entire to toothed; rays white to rose-purple — *E. uniflórus*

(y) Involucres white-bristly to glandular or smooth, but not woolly — *E. elátior*

m. Stems 2-8 in. high, 1-headed, tufted; leaves mostly basal

(m) Involucre dotted-glandular; leaves smooth, spatulate to obovate; rays violet

m. Stems 1-8 in. high, mostly single; — *E. leiómerus*

(n) Involucre with at least some white-bristly hairs, often densely so, sometimes glandular also

r. Leaves obovate, gray-hairy; rays violet — *E. téner*

s. Leaves linear to linear-oblanceolate, hairy; rays white to blue-purple

(r) Leaves glandular as well as hairy — *E. glandulósus*

(s) Leaves not glandular, more or less gray-hairy — *E. radicátus*

n. Stems 8 in.-3 ft. high, or if lower with several heads, more or less leafy; heads in most very large

(m) Heads small, the disk usually 1 cm. or less; stems tufted

r. Stems with long bristly white hairs; leaves mostly linear, rays white to blue — *E. púmilus*

s. Stem with soft close hairs; leaves lanceolate to spatulate; rays white to blue — *E. caespitósus*

(n) Heads large, the disk 1-2 cm. wide; stems single or clustered

r. Involucral bracts spreading and reflexed — *E. salsuginósus*
s. Involucral bracts erect and appressed
(r) Upper stem leaves greatly reduced, mostly few and bract-like, hairy to nearly smooth — *E. ásper*
(s) Stem leaves not bract-like, usually many and gradually reduced — *E. macránthus*
(2) Annual or biennial, without rootstocks, runners, etc.
(a) Stem leaves broad, clasping by a heart-shaped base; rays usually pink — *E. philadélphicus*
(b) Stem leaves not broad and clasping
x. Stems much branched at the base, 4-12 in. high; rays usually rose or purplish — *E. divérgens*
y. Stems simple at base, branched above, 1-2 ft. high; rays white — *E. ramósus*
b. Bracts of the involucre in 3 or 4 rows, the outer usually shorter; stems tufted from a woody base with long woody roots; leaves spatulate to linear, more or less silvery-hairy
(1) Heads 12-15 mm. high; involucres 2-2.5 cm. wide; rays 12-15 mm. long; achenes hairy — *E. argentátus*
(2) Heads 6-10 mm. high; involucres 1-1.5 cm. wide; rays 6-15 cm. long; achenes smooth or hairy — *E. cánus*

Eriophýllum Lagasca 1818

(Gr. *erion*, wool, *phyllon*, leaf, from the woolly plant)

Heads with yellow ray-flowers, the disk-flowers yellow, perfect, achenes narrow club-shaped to wedge-oblong, usually 4-angled, pappus of scales; receptacle flat to convex, involucre hemispheric, of separate or united bracts in 1-2 series; heads solitary or scattered; leaves alternate or opposite; entire or lobed; annual or perennial.

1. Stems 1-4 in. high; heads sessile or nearly so — *E. wallácei*
2. Stems 4-12 in. high; heads stalked — *E. integrifólium*

PLATE 39

ASTER FAMILY

1, 6. Ratibida columnaris: Cone Flower
2. Rudbeckia laciniata: Golden Glow
3. Thelesperma gracile
4. Rudbeckia hirta: Blackeyed Susan
5. Gymnolomia multiflora
7. Helianthus petiolaris: Sunflower
8. Thelesperma trifidum

ROCKY MOUNTAIN FLOWERS

PLATE 39.

Eupatórium Linné 1753 Boneset, Joe Pyeweed

(Named for Mithridates Eupator)

Heads with white, blue or purple perfect tube-flowers, achenes oblong, 5-angled, pappus of hair-like bristles; receptacle flat to conic, without chaff, involucre hemispheric to oblong, bracts imbricated in 2-several rows; heads in cymose panicles; leaves opposite or whorled, usually simple; perennial.

1. Leaves opposite, 1-2 in. long
   a. Bracts of the involucre nerved or ribbed — *E. féndleri*
   b. Bracts of the involucre not nerved — *E. texénse*
2. Leaves usually in whorls of 3, 2-5 in. long — *E. maculátum*

Filágo Linné 1753

(Lat. *filum*, thread, *ago*, like, from the cottony wool)

Heads without rays, outer pistillate flowers in several rows, central flowers few, perfect, mostly sterile, achenes flattened or rounded, pappus none; receptacle convex to conic with chaff, involucre of a few papery bracts; heads clustered, with leafy bracts; leaves alternate, entire; white, woolly annual.

Stems 2-6 in. high; leaves spatulate, 8-15 mm. long — *F. prolifera*

Flavéria Jussieu 1789

(Lat. *flavus*, yellow, from its use as a yellow dye)

Heads with a single yellow, pistillate ray, 2-5-flowered, disk-flowers perfect, yellow, achenes oblong or linear, 8-10-ribbed, pappus none; involucre of 2-5 equal bracts; heads in clusters; annual.

Stems 8-20 in. high; leaves linear to lanceolate, entire or toothed — *F. angustifólia*

Fransèria Cavanilles 1793

(Named for Franser, a Spanish botanist)

Heads without ray-flowers, monoecious, staminate heads in terminal spikes or racemes, pistillate heads solitary or clustered, achenes obovoid, pappus none; receptacle of the staminate heads chaffy, the involucre hemispheric, open, 5-12-lobed, involucre of the pistillate heads globose or ovoid, closed, 1-4-beaked, with several rows of spines, forming a bur in fruit; leaves entire to pinnatifid; annual or perennial.

1. Leaves simple or once-pinnatifid — *F. gráyi*
2. Leaves 2-3-pinnatifid
   a. Fruiting involucre 1-flowered, its spines flat and thin; annual — *F. acanthicárpa*
   b. Fruiting involucre 2-flowered, its spines short and conic; perennial

(1) Spines of the involucre usually hooked; racemes of staminate heads usually panicled — *F. tenuifólia*

(2) Spines not hooked; raceme of staminate heads usually solitary — *F. tomentósa*

Gaillárdia Fougeroux 1786 Gaillardia

(Named for Gaillard de Martentonneau, a French botanist)

Pl. 40, fig. 3.

Heads with yellow, orange or purple neutral, rarely pistillate ray-flowers, disk-flowers orange to purplish, perfect, achenes top-shaped, 5-ribbed, usually densely woolly, pappus of 5-12 awned scales; receptacle convex to globose, usually bristly, involucre low hemispheric, bracts imbricated in 2-3 rows with spreading or reflexed tips; heads solitary on long stalks; leaves alternate or basal, entire to pinnatifid; annual or perennial.

1. Lobes of the disk-flowers pointed, often tipped with a tooth, with long beaded hairs on the outside — *G. aristáta*
2. Lobes of the disk-flowers short, broad and obtuse, without beaded hairs — *G. pinnatífida*

Gnaphálium Linné 1753 Everlasting

(Gr. *gnaphalion*, name of a woolly plant)

Heads without ray-flowers, pistillate flowers in several rows, central flowers perfect, achenes oblong to obovate, round or flattened, pappus of hair-like bristles; receptacle flat to conic, without chaff, involucre oblong to bell-shaped, the bracts imbricated in several rows, usually papery and woolly; heads in racemes, corymbed spikes or dense clusters; leaves alternate, mostly entire; annual or perennial.

1. Heads with leafy bracts; involucres more or less woolly all over; stems simple or branched; leaves variously woolly — *G. palústre*
2. Heads without leafy bracts; involucre woolly only at base
   a. Leaves woolly on both surfaces
      (1) Leaf-bases running down the stem — *G. chilénse*
      (2) Leaf-bases not running down the stem — *G. wrighti*
   b. Leaves green above, sticky-hairy, running down the stem — *G. decúrrens*

GRINDÉLIA Willdenow 1807 GUMWEED
(Named for Grindel, a Russian botanist)
Pl. 38, fig. 8.

Heads with yellow pistillate ray-flowers or none, disk-flowers yellow, perfect or staminate, achenes oblong-ovoid, 4-5-ribbed, pappus of 2-8 awns or bristles, soon falling; receptacle flat or convex, without chaff, involucre hemispheric, the bracts imbricated in several-many rows, often spreading and reflexed; heads solitary at the ends of branches; leaves alternate, usually spiny-toothed, often clasping; perennial, often woody at base.

1. Heads hemispheric; involucral bracts narrow, the reflexed tips awl-shaped; rays often absent *G. squarrósa*
2. Heads broad and flat; involucral scales broad, the reflexed tips flat *G. texána*

GUTIERRÉZIA Lagasca 1816 GUTIERREZIA
(Named for Gutierrez, a Spanish noble)
Pl. 38, fig. 6.

Heads with 1-10 yellow, pistillate ray-flowers, disk-flowers 1-10, yellow, perfect or some staminate, achenes ovoid, rounded, ribbed or 5-angled, pappus of several scales; receptacle flat to conic, without chaff, involucre ovoid to oblong, bracts somewhat papery, imbricated in a few rows; heads in corymbose panicles; leaves alternate, linear, entire; perennial, often woody at base.

Stems bushy-branched, 6-25 in. high; leaves linear, 1-4 cm. long; heads 3-4 mm. high; rays 1-10 *G. saróthrae*

GYMNOLÓMIA H. B. K. 1820 GYMNOLOMIA
(Gr. *gymnos,* naked, *loma,* fringe, from the absent pappus)
Pl. 39, fig. 5.

Heads with yellow pistillate ray-flowers, disk-flowers yellow or brown, perfect, achenes 4-angled, pappus a toothed crown or none, receptacle conic, with chaff, involucre hemispheric to bell-shaped, bracts in 2-3 rows; heads solitary on the branches; leaves alternate or opposite, simple, entire or toothed; perennial.

Stems 1-5 ft. high; leaves linear to lanceolate; rays 10-15 *G. multiflóra*

HAPLOÉSTHES Gray 1859

(Gr. *haploos,* simple, *esthes,* garment, from the few bracts of the involucre)

Heads with yellow pistillate ray-flowers, disk-flowers perfect, yellow, achenes linear, rounded, ribbed, pappus of bristles; receptacle flat, without chaff, involucre bell-shaped, of 4-5 nearly equal fleshy bracts, the outer

overlapping the inner; heads in loose cymes; leaves opposite, entire; perennial.

Stems 1-2 ft. high; leaves linear or filiform; rays oval, 2-4 mm. long — *H. gréggi*

HAPLOPÁPPUS Cassini 1828 HAPLOPAPPUS
(Gr. *haploos,* simple, *pappos,* pappus)

Heads with yellow, pistillate rays or none, disk-flowers yellow, perfect, achenes linear to top-shaped, pappus of hair-like bristles; receptacle flat to convex, without chaff, involucre usually broad, the bracts more or less imbricated, often with leaf-like tips; heads solitary or in corymbs; leaves alternate, entire to pinnatifid, sometimes spiny-toothed; annual or perennial.

1. Involucre of firm or rigid well-imbricated bracts; pappus dark or reddish
   a. Heads rayless; achenes silky; leaves lanceolate to spatulate-oblong, toothed — *H. nuttálli*
   b. Heads with rays .5-1 in. long; achenes smooth; leaves entire
      (1) Stems equally very leafy up to the sessile or subsessile head; leaves lanceolate; rays .5 in. long — *H. fremónti*
      (2) Stems with few sparse leaves above, the heads stalked
         (a) Bracts of the involucre ovate to oblong; rays nearly or quite an inch long — *H. cróceus*
         (b) Bracts oblong to lance-linear; rays .5 in. long — *H. integrifólius*
   c. Heads with rays 6-12 mm. long; achenes hairy
      (1) Rays 7-10; leaves narrowly linear, entire; stems 1-3 in. high — *H. multicaúlis*
      (2) Rays 15-50; leaves mostly toothed to pinnatifid
         (a) Stems usually simple with a tuft of basal leaves; leaves entire or spiny-toothed; rays 20-50
            x. Heads usually solitary — *H. uniflórus*
            y. Heads 3-15 — *H. lanceolátus*
         (b) Stems branching and leafy; leaves toothed to pinnatifid, teeth spiny-tipped; rays 15-30

x. Plants sticky-hairy; leaves toothed to pinnatifid *H. rubiginósus*
y. Plants gray-hairy to smooth; leaves 1-2-pinnately parted *H. spinulósus*

2. Bracts of the involucre not well-imbricated or rigid, more or less equal; pappus white or whitish; leaves entire
a. Heads solitary; rays conspicuous
(1) Rays 15-20; leaves soft, not persistent
(a) Plants green, not woolly
x. Plants soft-hairy or smooth; involucral bracts oblong, the outer leaf-like and very obtuse; achenes hairy *H. pygmaéus*
y. Plants sticky-hairy; involucral bracts lanceolate, acute; achenes smooth or nearly so *H. lýalli*
(b) Plants woolly or felted, at least the involucre; leaves narrowly spatulate to linear; bracts lanceolate, pointed; achenes silky *H. lanuginósus*
(2) Rays 6-15; leaves stiff and persistent; achenes hairy; stems nearly leafless, 1-headed, 1-6 in. high *H. acáulis*
b. Heads in cymes or clusters; rays 12-20, small and narrow; achenes smooth or nearly so; stems .5-2 ft. high; leaves oblong-ovate to spatulate *H. párryi*

3. Bracts of the involucre more or less equal, with conspicuous leafy tips or passing into leaves; pappus soft; leaves linear, entire; rays 2-5 or none
a. Plants densely white-felted; heads about 1 in. high; rays none *H. macronéma*
b. Plants not felted; heads 15-18 mm. high; rays 2-5 or none *H. suffruticósus*

Helénium Linné 1753 Sneezeweed

(The Greek name of some plant)

(Dugaldea Cass.)

Pl. 41, fig. 3.

Heads with yellow to orange pistillate or neutral ray-flowers, disk-flowers yellow, perfect, achenes top-shaped, ribbed, pappus of 5-8 entire,

PLATE 40

ASTER FAMILY

1. Bidens levis: Bur Marigold
2. Arnica cordifolia
3. Gaillardia aristata
4. Senecio fendleri: Groundsel
5. Ximenesia encelioides
6. Actinella richardsoni
7. Helianthella parryi

ROCKY MOUNTAIN FLOWERS

PLATE 40.

toothed or awned scales; receptacle convex to oblong, without chaff, involucre low hemispheric, the bracts in 1-2 rows, spreading or reflexed; heads solitary on the branches; leaves alternate, simple, toothed, often decurrent; annual or perennial.

1. Rays orange to purplish; stems not winged by the leaf-bases
   a. Rays 2-4 cm. long; leaves spatulate to lance-oblong, mostly entire — *H. hoópesi*
   b. Rays about 1 cm. long; leaves linear to linear-lanceolate, usually parted into 3-5 linear divisions — *H. helenioides*
2. Rays bright yellow, 3-cleft at tip; stem winged by the decurrent bases of the lanceolate to lance-ovate leaves — *H. autumnále*

HELIANTHÉLLA Torrey and Gray 1840 HELIANTHELLA
(Diminutive of Helianthus, which it resembles)
Pl. 40, fig. 7.

Heads with yellow neutral ray-flowers, disk-flowers yellow or purple, perfect, achenes flattened, somewhat winged, pappus of scales or awns or both; receptacle with chaff, involucre hemispheric, the bracts in 2-3 rows, more or less leaf-like; heads solitary; leaves alternate, simple, mostly entire; perennial.

1. Disk yellowish
   a. Disk 2-3 cm. wide; rays 2.5-4 cm. long; stems 2-5 ft. high — *H. quinquenérvis*
   b. Disk 1-2 cm. wide; rays 1.5-3 cm. long; stems 1-2 ft. high — *H. párryi*
2. Disk dark purple
   a. Heads several; rays 5-6 mm. long — *H. microcéphala*
   b. Heads mostly solitary; rays 2-3 cm. long — *H. uniflóra*

HELIANTHUS Linné 1753 SUNFLOWER
(Gr. *helios*, sun, *anthos*, flower)
Pl. 39, fig. 7.

Heads with yellow neutral ray-flowers, disk-flowers yellow, brown or purple, perfect, achenes oblong or obovate, flattened or somewhat 4-angled pappus of 2 scales or awns falling readily; receptacle flat to conic, with chaff, involucre hemispheric, the bracts imbricated in several rows; heads solitary or in corymbs; leaves opposite or alternate, simple; annual or perennial.

1. Disk brown or purplish
   a. Leaves all, or nearly all, opposite, thick, leathery, toothed, lanceolate to lance-oblong — *H. rígidus*

b. Leaves mostly alternate, only the lower opposite
(1) Leaves linear or lance-linear; perennial *H. orgyális*
(2) Leaves ovate; annual
(a) Leaves entire or nearly so; bracts of the involucre lanceolate, gray-hairy *H. petioláris*
(b) Leaves toothed; bracts oblong to ovate, long-pointed, hairy and ciliate *H. ánnuus*

2. Disk yellow
a. Leaves opposite; stems rough and bristly, 1-3 ft. high *H. púmilus*
b. Some of the upper leaves alternate
(1) Stem leaves rough and somewhat hairy *H. maximiliáni*
(2) Stem smooth, often glaucous
(a) Leaves mostly sharply toothed, hairy beneath *H. grosse-serrátus*
(b) Leaves entire or finely toothed, not hairy beneath *H. nuttálli*

Heliópsis Persoon 1807 Ox-eye

(Gr. *helios*, sun, *opsis*, likeness)

Heads with yellow pistillate ray-flowers, rays persisting, disk-flowers yellow, perfect, achenes 3-4-angled, pappus a short, toothed crown, or of 1-3 awns; receptacle convex to conic, with chaff, involucre hemispheric, the bracts imbricated in 2-3 rows; heads solitary, terminal and axillary; leaves opposite, simple, perennial.

Stems 2-5 ft. high; leaves ovate or lance-ovate, toothed, 2-5 in. long; rays an inch long or more *H. scábra*

Hierácium Linné 1753 Hawkweed

(Gr. *hierax*, hawk)

Heads with yellow, orange or red perfect strap-flowers, achenes oblong to cylindric, not beaked, 10-15-ribbed, round or 4-5-angled, pappus of brown or brownish hair-like bristles; receptacle flat, without chaff, involucre bell-shaped to cylindric, the bracts in 1-3 rows, often with smaller basal ones; heads solitary or in corymbs or panicles; leaves alternate or basal, entire to toothed or lobed; perennial.

1. Bracts of the involucre in 2-4 rows; stems leafy
a. Leaves, at least the upper, clasping; involucre hairy *H. canadénse*
b. Leaves not clasping; involucre smooth *H. umbellátum*

2. Bracts of the involucre in 1 row with some short basal ones; stems naked or with few leaves
   a. Flowers white or yellowish — *H. albiflórum*
   b. Flowers yellow
      (1) Achenes tapering gradually to a narrow tip — *H. féndleri*
      (2) Achenes cylindric, not tapering above
         x. Involucres black-hairy — *H. grácile*
         y. Involucres white-hairy — *H. scoúleri*

Húlsea Torrey and Gray 1849

(Named for Hulse, an American physician)

Heads with yellow or purple ray-flowers, disk-flowers perfect, yellow, achenes linear-wedge-shaped, flattened or somewhat 4-angled, hairy, pappus of 4 scales; receptacle flat, without chaff, involucre hemispheric with bracts in 2-3 series; flowers solitary as a rule; leaves alternate, sessile, entire to pinnatifid; perennial.

Plants fleshy; leaves lobed, 2-4 in. long; rays 7-9 mm. long — *H. carnósa*

Hymenopáppus L'Héritier 1803 Hymenopappus

(Gr. *hymen*, membrane, *pappos*, pappus)

Pl. 41, fig. 4.

Heads without rays, disk-flowers white to yellow, perfect, achenes obovoid to long wedge-shaped, 4-5-angled, pappus of 10-20 scales, sometimes short or none; receptacle flat, naked, involucre hemispheric to bell-shaped, bracts 6-12 in 1-2 rows, usually colored, the margins papery; heads solitary or in corymbs; leaves alternate or basal, usually pinnatifid or dissected; perennial or biennial.

Stems 4 in. to 2 ft. high; leaves 1-3-pinnatifid, gray-hairy or felted to green and nearly smooth; corolla-throat 2-4 times the length of the lobes; pappus scales of various lengths — *H. tenuifólius*

Isocóma Nuttall 1841

(Gr. *isos*, equal, *kome*, tuft, perhaps from the pappus)

Heads without rays, disk-flowers yellow, perfect, achenes short, silky-hairy, pappus of darkish hair-like bristles; receptacle flat, without chaff, the bracts imbricated in several rows, often papery; heads in a corymb-like cyme; leaves simple, entire or somewhat deeply toothed, usually sticky; perennial, somewhat woody at base.

Stems 1-2 ft. high; leaves narrowly linear; heads 8-10 mm. high, 7-15 flowered — *I. wrighti*

Íva Linné 1753 Marsh Elder

(Named from Ajuga iva, from its similar smell)

Heads without rays, the marginal flowers 1-6, pistillate, disk-flowers greenish, perfect but sterile, achenes obovoid, flattened, pappus none; receptacle flat, with chaff, involucre hemispheric or cup-shaped, bracts few; heads solitary or variously clustered; leaves opposite or alternate, simple; annual or perennial.

1. Heads 4-6 mm. wide, solitary in the leaf-axils; leaves sessile, oblong to spatulate — *I. axilláris*
2. Heads 1-2 mm. wide, crowded in panicled spikes; leaves ovate, petioled — *I. xanthifólia*

Kúhnia Linné 1753 False Boneset

(Named for Kuhn, an American botanist)

Heads without rays, tube-flowers perfect, cream-colored, achenes oblong, striate, pappus of feathery, hair-like bristles; receptacle flat, without chaff, involucre oblong, the bracts striate, imbricated in several rows; heads in terminal corymbs; leaves alternate, simple; perennial.

Stems 1-2 ft. high; leaves linear to lance-ovate, entire or toothed; heads 8-16 mm. high — *K. eupatorioides*

Laciniária Hill 1762 Blazing Star

(Lat. *lacinia,* fringe, from the appearance of the heads)

(Liatris Schreber)

Pl. 37, fig. 1.

Heads without rays, tube-flowers rose-purple, perfect, achenes oblong or club-shaped, ribbed, pappus of feathery hair-like bristles; receptacle flat, without chaff, involucre oblong to ovoid, the bracts imbricated in several rows; heads in spikes or racemes; leaves alternate, entire, long and narrow; perennial.

1. Heads 3-6-flowered, less than 1 cm. wide as a rule; bracts pointed — *L. punctáta*
2. Heads many-flowered, 1-2.5 cm. wide; bracts rounded — *L. scariósa*

Lactúca Linné 1753 Lettuce

(The Latin name from *lac,* milk)

Pl. 37, fig. 2.

Heads with yellow, white or blue perfect strap-flowers, achenes linear to oval, flat, 6-10-ribbed, narrow above or contracted into a beak, pappus of

white or brown hair-like bristles; receptacle flat, without chaff, involucre cylindric, the bracts in several rows; heads in panicles; leaves alternate, entire to pinnatifid; annual, biennial or perennial.

1. Pappus white; achenes with a distinct beak
   a. Flowers yellow or reddish-yellow
      (1) Leaves with spiny margins and often with spiny mid-ribs
         (a) Heads 6-12-flowered; involucre 8-12 mm. high — *L. scariola*
         (b) Heads 12-many-flowered; involucre 15-20 mm. high — *L. ludoviciána*
      (2) Leaves without spiny margins or mid-rib; involucre 8-12 mm. high — *L. canadénsis*
   b. Flowers blue, purplish or white
      (1) Involucre 12-14 mm. high; achenes 1-3-nerved — *L. graminifólia*
      (2) Involucre 16-18 mm. high; achenes striate — *L. pulchélla*
2. Pappus brown; achenes beakless; flowers blue to yellowish or whitish — *L. spiecáta*

Láyia Hooker and Arnott 1833
(Named for Lay, a British naturalist)

Heads with white or rose-colored rays, disk-flowers yellow, perfect, achenes flattened, ray-achenes without pappus, disk-achenes with a pappus of 10-20 bristles; receptacle flat, with chaff, involucre with flattened bracts, enclosing the ray-achenes; heads mostly solitary on the ends of branches; leaves alternate, usually pinnatifid; annual.

Stems 8-15 in. high, much-branched; leaves lanceolate to linear, the lower pinnatifid; rays 8-13, 3-lobed — *L. glandulósa*

Léptilum Rafinesque 1818 Horseweed
(Gr. *leptos,* narrow, from the small heads)
(Erigeron L.)

Heads with white or purplish pistillate ray-flowers, disk-flowers perfect, yellow or yellowish, achenes flattened, oblong; receptacle flat, without chaff, involucre bell-shaped, the bracts in 2-3 rows; heads in racemes or branched panicles; leaves alternate, simple; annual or biennial.

1. Stems 1-6 ft. high; involucre smooth; rays white — *L. canadénse*
2. Stems 3-12 in. high; involucre hairy; rays purplish — *L. divaricátum*

Leucámpyx Gray 1874

(Gr. *leukos,* white, *ampyx,* head-band, from the white-bordered bracts)

Heads with white or cream-colored pistillate rays, disk-flowers yellow, perfect, achenes wedge-shaped, incurved, flattened, pappus none; receptacle convex, with chaff, involucre hemispheric, the bracts imbricated in 2-3 rows, broadly white-papery at the top; heads more or less corymbose; leaves alternate, 2-3-pinnately parted; perennial.

Stems 1-2 ft. high; rays 10-12 mm. long; achenes black — *L. newbérryi*

Lygodésmia Don 1829 Milk Pink

(Gr. lygos, a pliant twig, *desme,* a bundle, referring to the rush-like stems)

Heads with pink or rose perfect strap-flowers, achenes terete, faintly striate or angled, linear to club-shaped, pappus of white or whitish hair-like bristles; receptacle flat, without chaff, involucre of one row of main bracts, with one or more shorter rows below; heads 3-12-flowered, usually terminal; leaves alternate, linear or scale-like; annual or perennial.

1. Stems .5-1.5 ft. high, perennial; leaves mostly less than 3 in. long
   a. Heads 5-flowered; involucre 10-12 mm. high — *L. júncea*
   b. Heads 6-10-flowered; involucre 20-25 mm. high — *L. grandiflóra*
2. Stems 1-4 ft. high, annual; leaves 2-6 in. long; heads 8-9-flowered — *L. rostráta*

Machaeránthera Nees 1832 Purple Aster

(Gr. *machaera,* sickle, *anthera,* anther)

Pl. 38, fig. 4.

Heads with pale violet to purple pistillate rays, disk-flowers yellow, becoming red or brown, perfect, achenes top-shaped, usually hairy, pappus of hair-like bristles; receptacle convex or flat, without chaff, involucre bell-shaped, the bracts imbricated in many rows, usually spreading or reflexed; heads in corymbs or panicles; leaves alternate, entire to pinnatifid, the lobes often bristle-tipped; annual, biennial or perennial.

1. Leaves entire to ciliate or spiny toothed
   a. Bracts of the involucre with reflexed often awl-shaped tips usually longer than the erect basal portion; flower clusters typically very sticky-hairy
      (1) Stems 1-4 ft. high bearing usually many heads; leaves mostly lance-oblong, broadened and clasping at the base; tips of bracts mostly awl-shaped — *M. bigclóvi*

(2) Stems 2-8 in. high, tufted, usually 1-headed; leaves usually spatulate, tapering to the base, not clasping; tips of the bracts broad and flat *M. pattersóni*

b. Bracts of the involucre erect or with flat reflexed tips shorter than the basal portion; leaves mostly gray-hairy, oblanceolate to linear; stems usually much branched, many-headed, .5-2 ft. high *M. canéscens*

2. Leaves 1-3-pinnatifid *M. tanacetifólia*

MÁDIA Molina 1782 TARWEED

(From the Chilian name of the common species)

Heads with yellow pistillate rays, the rays rarely lacking, disk-flowers yellow, perfect, achenes flattened, enclosed in the folded bracts, pappus none; receptacle flat or convex, with a single row of bracts enclosing the disk-flowers, involucre ovoid or oblong, angled by the projecting backs of the bracts; heads axillary and terminal; leaves mostly alternate, entire or toothed, sticky; annual

Stems 1-2 ft. high; leaves linear; rays 2-5, sometimes none *M. glomeráta*

MALACÓTHRIX DeCandolle 1838

(Gr. *malakos,* soft, *thrix,* hair)

Heads with yellow or white perfect strap-flowers, achenes oblong or linear, ribbed, 4-5-toothed, pappus of hair-like bristles in 2 rows; receptacle flat, without chaff, involucre bell-shaped, main bracts in 1-2 rows with several rows of shorter ones; heads solitary or panicled; leaves alternate or basal, mostly pinnatifid; annual or perennial.

1. Achene crowned by a 15-toothed white border *M. sonchoídes*
2. Achene with an entire crown *M. féndleri*

MATRICÁRIA Linné 1753 CAMOMILE

(Lat. *matrix,* womb, from its medicinal virtues)

Heads without rays in our species, disk-flowers yellow, perfect, achenes oblong, 3-5-ribbed, pappus a crown, or none; receptacle conic or hemispheric, without chaff, involucre hemispheric, the bracts imbricated in a few rows; heads solitary on the branches; leaves alternate, dissected; annual or perennial.

Stems 6-8 in. high; leaves 2-3-pinnately dissected; heads 6-8 mm. wide *M. discoídea*

MELAMPÓDIUM Linné 1753

(Gr. *melas,* black, *podion,* little foot)

Heads with white pistillate ray-flowers, disk-flowers yellow, perfect, achenes obovoid, somewhat curved, pappus none; receptacle convex or conic, with chaff, involucre hemispheric, bracts in 2 rows, 4-5 outer broad, the inner hooded, more or less embracing the ray-flowers; heads solitary; leaves opposite, mostly entire; perennial.

Stems 4-12 in. high; leaves linear to spatulate, 1-2 in. long; rays 5-9, 2-3-lobed *M. cinéreum*

NOTHOCÁLAIS Greene 1886 FALSE DANDELION

(Gr. *nothos,* false; Calais)

Heads with yellow perfect strap-flowers, achenes spindle-shaped, narrowed above, 10-ribbed, pappus of 10-30 scales, often with hair-like bristles as well; receptacle flat, without chaff, involucre bell-shaped, bracts in 2-4 rows; heads solitary; leaves basal, entire; perennial.

Leaves lance-linear, 4-8 in. long; heads 1-2 in. wide *N. cuspidáta*

OXYTÉNIA Nuttall 1848

(Gr. *oxytenes,* pointed, from the rigid leaves)

Heads without rays, pistillate flowers about 5, without corolla, staminate flowers 10-20, achenes obovate, hairy, pappus none or a single scale; receptacle convex, with chaff, involucral bracts about 5, long-pointed; heads in dense panicles; leaves alternate, 3-5-parted into narrow divisions; shrubby perennial.

Stems 3-6 ft. high, sometimes leafless; leaves 4-6 in. long; heads 4 mm. high *O. acerósa*

PARTHÉNICE Gray 1853

(Gr. *parthenice,* virgin)

Heads without rays or the latter inconspicuous, pistillate flowers 6-8, staminate flowers 40-50, achenes oblong-obovate, falling away, enclosed by bracts, pappus none; receptacle convex, with chaff around the outer series of staminate flowers, involucre of 5 greenish outer bracts and 6-8 large roundish, papery inner ones; heads in panicles; leaves alternate, simple; annual.

Stems 3-6 ft. high; leaves ovate, 6-12 in. long; heads greenish-white, 4 mm. wide *P. móllis*

PÉCTIS Linné 1753

(Lat. *pecten,* comb, from the pappus)

Heads with yellow pistillate ray-flowers, disk-flowers yellow, perfect, achenes linear, striate, pappus of 4-6 somewhat united short scales, often

with 2 awns; receptacle flat, without chaff, involucre oblong, the bracts in 1 row; heads in cymes; leaves opposite, narrow, entire, dotted with glands; annual.

Stems 4-12 in. high; leaves linear, .5-2 in. long; heads 5-6 mm. wide — *P. angustifólia*

PERICÓME Gray 1853

(Gr. *peri,* around, *kome,* hair, from the hairy achenes)

Heads without rays, the disk-flowers yellow, perfect, achenes linear-oblong with margins long-hairy, pappus a crown of fringed scales; involucre bell-shaped, the bracts united by their edges; heads in cymes; leaves opposite, long-tapering; perennial.

Stems very bushy, 2-5 ft. high and wide; leaves hastate, 2-4 cm. long; heads 9-12 mm. wide — *P. caudáta*

PETÁSITES Gaertner 1791 COLTSFOOT

(Gr. *petasites,* a broad-rimmed hat, from the broad leaves)

Heads tubular, or some with white pistillate rays, disk-flowers white or purplish, perfect but sterile, achenes linear, pappus of hair-like bristles; receptacle flat, without chaff, involucre bell-shaped to cylindric, the bracts equal in 1 row; heads often dioecious, or somewhat so, in racemes or corymbs; leaves basal, broad; perennial.

Flower-stalks .5-2 ft. high; leaves triangular-ovate, heart-shaped at base, white-woolly below, 4-10 in. long — *P. sagittáta*

PLATYSCHKÚHRIA Rydberg 1906

(Gr. *platys,* flat, Schkuhria)

Heads with yellow pistillate ray-flowers, disk-flowers yellow, perfect, achenes linear-wedge-shaped, pappus of about 10 lance-linear abruptly pointed scales; receptacle flat, without chaff, involucre bell-shaped or hemispheric, the bracts nearly equal in 1-2 rows; heads solitary or somewhat corymbose; leaves alternate, entire; perennial.

Stems 4-12 in. high; leaves oval to spatulate; heads 10-12 mm. high; rays 6-9 — *P. integrifólia*

POLÝPTERIS Nuttall 1818

(Gr. *polys,* many, *pteris,* wing)

Heads with rose-purple pistillate ray-flowers in ours, the rays 3-cleft, disk-flowers purplish, perfect, achenes linear to wedge-shaped, 4-angled, pappus of 8-12 pointed scales; receptacle flat, without chaff, involucre bell-shaped, the bracts in 1-2 rows, usually colored; heads in corymbs; leaves alternate or opposite, usually entire; annual.

PLATE 41

ASTER FAMILY

1. Bahia dissecta
2. Actinella acaulis
3. Heyenium hoopesi: Sneezeweed
4. Hymenopappus tenuifolius
5. Pericome caudata
6. Dysodia papposa
7. Rydbergia grandiflora

2
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4
1
7
5
6

Stems 1-3 ft. high, sticky; leaves lanceolate, 2-4 in. long; rays 8-10 *P. hookeriána*

PRENANTHÉLLA Rydberg 1906
(Diminutive of Prenanthes)

Heads with rose or pink perfect strap-flowers, achenes wedge-shaped, 4-5-ribbed, pappus of white, hair-like bristles; receptacle flat, without chaff, involucre oblong, with 1 row of oblong bracts and 1-2 small basal ones; heads solitary at the ends of the branches; leaves alternate, entire to pinnatifid; annual.

Stems 4-10 in. high; leaves spatulate to oblong; involucre 4 mm. high, 4-5-flowered *P. exígua*

PRENÁNTHES Linné 1753 RATTLESNAKE ROOT
(Gr. *prenes,* drooping, *anthos,* flower)
(Nabalus Cass.)

Heads of white, yellowish or purplish perfect strap-flowers, achenes oblong or cylindric, round or 4-5-angled, ribbed, pappus of white to reddish-brown, hair-like bristles; receptacle flat, without chaff, involucre cylindric, the main bracts in 1-2 rows, a few small ones at the base; heads in panicles; leaves alternate, dentate to pinnatifid; perennial.

1. Basal leaves obovate; involucre somewhat hairy *P. sagittáta*
2. Basal leaves arrow-shaped; involucre smooth *P. racemósa*

PSILOSTRÓPHE DeCandolle 1838
(Gr. *psilos,* naked, *strophe,* ridge)

Heads with 3-4 yellow pistillate ray-flowers, disk-flowers 5-12, yellow, perfect, achenes linear, striate, pappus of 4-6 scales; receptacle small, without chaff, involucre cylindric, bracts white-woolly, 4-10 in one row; heads in corymbs; leaves alternate, entire to pinnatifid; annual or perennial.

Stems 4-12 in. high; leaves entire to 3-lobed or pinnatfid; rays 3-5, broad and 2-3-lobed; pappus scales acute to obtuse *P. tagetína*

PTILOCÁLAIS Greene 1886
(Gr. *ptilon,* feather; Calais)

Heads with yellow perfect strap-flowers, achenes linear, pappus of white, hair-like bristles, scale-like at base; receptacle flat, without chaff, involucre cylindric, the main bracts in 1 row with a few short basal ones; heads solitary on the ends of branches; leaves entire to pinnately parted; perennial.

Stems 4-12 in. high; leaves spatulate-obovate or parted into linear lobes; heads 8-20-flowered *P. nútans*

Ptilória Rafinesque 1832
(Gr. *ptilon*, feather)
(Stephanomeria Nuttall)

Heads with pink perfect strap-flowers, achenes oblong to linear, 5-ribbed, sometimes beaked, pappus of hair-like bristles; receptacle flat, without chaff, involucre cylindric to oblong, main bracts in 1 row with a few shorter ones; heads solitary or panicled; leaves alternate or basal, entire to pinnatifid, those of the stem often mere scales; annual, biennial or perennial.

1. Perennial — *P. tenuifólia*
2. Annual or biennial
   a. Bristles of the pappus plumy to the base; involucre 4-8-flowered — *P. virgáta*
   b. Bristles of the pappus not plumy below the middle; involucre 5-flowered — *P. exígua*

Ratíbida Rafinesque 1818 Cone Flower
(Of unknown origin and meaning)
Pl. 39, fig. 1, 6.

Heads with yellow to purple-brown neutral ray-flowers, disk-flowers yellow, perfect, achenes oblong, flattened, margined or winged, pappus of 1-2 teeth, often with small intermediate scales; receptacle oblong to cylindric, with chaff, scales of the involucre in 2-3 rows; heads solitary on the ends of the branches; leaves alternate, pinnately divided; perennial.

1. Rays 2-4 cm. long, yellow or more or less purple-brown; disk cylindric 1-2 in. long — *R. columnáris*
2. Rays 5-9 mm. long, usually brown-purple; disk oblong, 1 cm. long — *R. tagétes*

Rudbéckia Linné 1753 Blackeyed Susan, Golden Glow
(Named for Rudbeck, a Swedish botanist)
Pl. 39, fig. 2, 4.

Heads with yellow to orange-yellow neutral ray-flowers, or none, disk-flowers purple or yellow, perfect, achenes oblong, 4-angled, pappus crown-like or of 2-4 short teeth or none; receptacle convex to conic, with chaff, involucre hemispheric, the bracts imbricated in 2-4 rows; heads solitary; leaves alternate, entire to pinnatifid; perennial to biennial

1. Rays present
   a. Leaves entire or toothed; stems 1-3 ft. high, rough-hairy — *R. hírta*

b. Leaves 3-7-divided; stems 3-6 ft. high, usually smooth *R. laciniáta*

2. Rays none
   a. Leaves entire or toothed; disk 3-5 cm. long *R. occidentális*
   b. Leaves pinnately parted; disk 5-7 cm. long *R. montána*

RYDBERGIA Greene 1898 RYDBERGIA
(Named for the American botanist Rydberg)
Pl. 41, fig. 7.

Heads with yellow pistillate ray-flowers, disk-flowers yellow, perfect, achenes top-shaped, ribbed or angled, hairy, pappus of 5-12 white scales, usually long-pointed; receptacle flat, without chaff, involucre hemispheric, the woolly bracts in several rows; heads solitary; leaves 2-5-parted or lobed into linear divisions, upper sometimes entire; alpine perennial.

1. Leaves and involucre woolly; rays 30 or more, 12-16 mm. long *R. grandiflóra*
2. Leaves smooth or nearly so; involucre merely hairy; rays 12-16, 6-8 mm. long *R. brandégei*

SENÉCIO Linné 1753 GROUNDSEL
(Lat. *senex*, old man, perhaps from the white pappus)
Pl. 40, fig. 4.

Heads with yellow pistillate ray-flowers or none, disk-flowers yellow, perfect, achenes oblong, rounded, ribbed, pappus of hair-like bristles; receptacle flat, without chaff, involucre bell-shaped to cylindric, the main bracts in 1 row, usually with some shorter ones; heads solitary or in corymbs or panicles; leaves alternate or basal, entire or pinnatifid; annual or perennial.

1. Heads large, 15-25 mm. high
   a. Heads with rays
      (1) Stem leaves clasping at base, usually sharply toothed *S. ampléctens*
      (2) Stem leaves distinctly petioled; not clasping
         (a) Leaves round or nearly so, smooth, mostly basal; heads erect *S. soldanélla*
         (b) Leaves spatulate to obovate, tapering into the petiole; heads nodding
            x. Stems 1-6 in. high; leaves somewhat lobed, white-woolly; heads single; rays 10-15 mm. long *S. taraxacoides*

y. Stems 6-12 in. high; leaves toothed, smooth; heads 1-6; rays 20-30 mm. long — *S. hólmi*

b. Heads rayless, nodding; stems .5-4 ft. high; leaves lanceolate to lance-ovate — *S. bigelóvi*

2. Heads medium to small, 5-15 mm. long

a. Heads distinctly nodding, many; stems branched, 1-4 ft. high; leaves lanceolate, entire, toothed or lobed, 2-6 in. long — *S. cérnuus*

b. Heads not nodding

(1) None of the leaves pinnatifid or pinnate

(a) Stems equally many-leaved to the top

x. Leaves linear — *S. spartioídes*

y. Leaves lanceolate to ovate or obovate

(x) Heads rayless 5-6 mm. high; leaves spatulate to obovate, coarsely toothed — *S. rapifólius*

(y) Heads with rays, 8-15 mm. high

m. Stems 4-12 in. high; leaves blunt, oblong to ovoid, coarsely sharp-toothed or lobed, 1-2 in. long; heads 10-12 mm. high — *S. fremónti*

n. Stems 1-6 ft. high; leaves lanceolate to lance-ovate, 3-10 in. long, many-toothed

(m) Stems 8-15 in. high; leaves 3-8 on a stem; heads 1-8, 12-15 mm. high — *S. crássulus*

(n) Stems 2-6 ft. high; leaves many on a stem; heads 8-10 mm. high

r. Leaves long-lanceolate, tapering to the base, 4-8 in. long, 1-3 cm. wide — *S. sérra*

s. Leaves triangular-ovate, heart-shaped or truncate at base, 2-6 in. long, 1-2 in. wide — *S. triangulária*

(b) Stems few-leaved or the upper much reduced in size

x. Stems simple, 2-5 ft. high; leaves fleshy, usually glaucous, entire or toothed, lance-oblong, 4-8 in. long — *S. hydróphilus*

y. Plants clustered or tufted from root-stocks, .5-2.5 ft. high
(x) Stems leafy
m. Rays wanting — *S. rapifólius*
n. Rays present
(m) Heads 12-15 mm. high — *S. crássulus*
(n) Heads 8-12 mm. high
r. Leaves glaucous; basal leaves obovate to broadly spatulate — *S. microdóntus*
s. Leaves not glaucous, white-woolly at first — *S. lúgens*
t. Leaves persistently white-hairy or woolly
(r) Stems 1-2 ft. high; leaves 2.5-5 in. long; heads 2-4 mm. wide — *S. atrátus*
(s) Stems 4-15 in. high; leaves 1-2 in. long, upper often lobed; heads 6-7 mm. wide — *S. cánus*
(y) Stems with the leaves all or nearly all basal
m. Leaves usually white-woolly, linear-spatulate to oblong-spatulate, mostly entire — *S. wernerifólius*
n. Leaves usually green, roundish, toothed or lobed above — *S. petraéus*

(2) Leaves, at least some of them, pinnatifid to pinnate
(a) Stems equally many-leaved to the top
x. Leaves or their segments linear or thread-like, white-woolly to smooth — *S. douglási*
y. Leaves pinnatifid, the divisions not linear but toothed or lobed — *S. eremóphilus*
(b) Stems with the leaves much reduced upwards, often to mere scales
x. Stems and leaves persistently white-woolly, rarely becoming smooth
(x) Basal leaves entire — *S. cánus*
(y) Basal leaves toothed to pinnatifid — *S. féndleri*

y. Stems and leaves white-woolly only when young, typically green and smooth at flowering; leaves variously toothed to pinnatifid, more rarely entire, round, oblong or lanceolate to spatulate; heads sometimes without rays, the latter yellow to orange-red *S. aúreus*

SOLIDÁGO Linné 1753 GOLDENROD

(Lat. *solidus*, whole, *-ago*, like, from its former use in medicine)

Pl. 38, fig .1.

Heads with yellow pistillate ray-flowers, disk-flowers yellow, mostly perfect, achenes round or angled, usually ribbed, pappus of hair-like bristles; receptacle flat or convex, without chaff, involucre oblong to bell-shaped, the bracts imbricated in several rows; heads in terminal axillary panicles, corymbs, cymes, etc.; leaves alternate, simple; perennial.

1. Heads in a flat-topped spreading cluster
   a. Rays fewer than the disk flowers, 1-10
      (1) Heads 8-10 mm. high, 30-40-flowered; rays 7-10; leaves ovate to oblong, very rough *S. rígida*
      (2) Heads 6-8 mm. high, 5-8-flowered; rays 1-3; leaves linear or lance-linear *S. púmila*
   b. Rays more numerous than the disk flowers, 12-20; heads 4-6 mm. high, disk flowers 8-14; leaves linear or lance-linear *S. lanceoláta*
2. Heads in a terminal cone-like, or a raceme-, spike- or head-like cluster, which is not flat-topped
   a. Stems and leaves smooth or nearly so
      (1) Leaves distinctly 3-veined
         (a) Stems 4-15 in. high; stem leaves oblanceolate to linear; in dry soil *S. missouriénsis*
         (b) Stems 1-5 ft. high; stem leaves lanceolate; along streams *S. serótina*
      (2) Leaves not 3-veined
         (a) Stems 2-4 ft. high; heads 3-4 mm. wide, very many in a much branched panicle-like cluster; at 4-7000 ft. *S. speciósa*
         (b) Stems 1 in.-2 ft. high; heads 5-7 mm. wide, mostly few in a compact head- or raceme-like cluster; at 7-13000 ft.

x. Bracts of the involucre sharp-pointed to tapering-pointed *S. multiradiáta*
y. Bracts of the involucre obtuse or rounded *S. húmilis*

b. Stems and leaves hairy, at least the leaves
(1) Leaves lanceolate, soft-hairy; stems 2-6 ft. high; heads 3-4 mm. high; rays 9-15 *S. canadénsis*
(2) Leaves oblanceolate, spatulate to elliptic or ovate, rough-hairy or gray-hairy; heads 4-6 mm. high; rays 5-9
x. Leaves oblanceolate to spatulate, rough-hairy *S. nemorális*
y. Leaves elliptic to ovate or obovate, densely gray-hairy *S. móllis*

Sónchus Linné 1753 Sow Thistle

(The Greek name)

Heads with yellow perfect strap-flowers, achenes linear to oval, somewhat flattened, ribbed, not beaked, pappus of white hair-like bristles; receptacle flat, without chaff, involucre ovoid to bell-shaped, the bracts imbricated in 2 or more rows; heads in corymbs or panicles; leaves alternate, usually clasping, entire to pinnatifid and prickly-margined; annual or perennial.

1. Involucre 20-25 mm. high, sticky-hairy; heads 1-2 in. wide *S. arvénsis*
2. Involucre 12-16 mm. high, smooth; heads an inch or less wide
a. Basal ears of the clasping leaves acute; achenes striate, wrinkled crosswise *S. oleráceus*
b. Ears of the leaves rounded; achenes ribbed, not wrinkled crosswise *S. ásper*

Tanacétum Linné 1753 Tansy

(Latinized from Fr. *tanasie*, Gr. *athanasia*, immortality)

Heads usually rayless, marginal flowers yellow, pistillate, sometimes forming short rays, disk-flowers yellow, perfect, achenes 5-angled or ribbed, pappus none or a short crown; receptacle flat or convex, without chaff, involucre hemispheric to bell-shaped, bracts imbricated in several rows; heads in corymbs; leaves alternate, 1-3-pinnately divided or dissected; perennial.

1. Leaves simple, oblong to linear and entire or 3-5-lobed at the tip *T. nuttálli*
2. Leaves 3-5-parted into linear lobes, as a rule *T. capitátum*

Taráxacum Haller 1768 Dandelion

(Gr. *tarasso,* to disturb, in allusion to its medicinal properties)

Heads with yellow perfect strap-flowers, achenes oblong to linear-spindle-shaped, 4-5-angled, roughened or spiny, tapering into a long beak, pappus of hair-like bristles; receptacle flat, without chaff, involucre oblong to bell-shaped, main bracts nearly equal in 1 row with several rows of outer shorter spreading bracts; heads solitary; leaves basal, wavy-toothed to pinnatifid; perennial.

Leaves toothed to pinnatifid, sometimes nearly entire; flower-stalk 1-15 in. long; heads 1-2 in. wide *T. officinále*

Tetradýmia DeCandolle 1837

(Gr. *tetradymos,* four together, the heads often but 4-flowered)

Heads without rays, the disk-flowers yellow or yellowish, perfect, achenes cylindric, rounded, often very woolly; receptacle flat, without chaff, involucre oblong to cylindric, of 4-6 concave overlapping bracts; heads cymose or clustered; leaves alternate, entire, sometimes clustered, occasionally modified into spines, usually densely felted; shrubs.

1. Heads 4-flowered; involucral bracts 4-5; achenes hairy to smooth; stems 1-2 ft. high
   a. Branches spiny *T. nuttálli*
   b. Branches not spiny; white wool permanent or disappearing *T. canéscens*
2. Heads 5-9-flowered; involucral scales 5-6; achenes white-woolly; stems 2-4 ft. high; branches spiny *T. spinósa*

Thelespérma Lessing 1831 Thelesperma

(Gr. *thele,* nipple, *sperma,* seed)

Pl. 39, fig. 3, 8.

Heads with yellow neutral ray-flowers or none, disk-flowers yellow to brownish, perfect, achenes linear to oblong, somewhat papillose, pappus of 2 barbed awns, sometimes none; receptacle flat, with chaff, involucre hemispheric to bell-shaped, the inner bracts united to the middle or above into a cup, the outer short, narrow and spreading; heads solitary on the ends of the branches; leaves opposite, entire and linear or finely dissected; annual or perennial.

1. Rays none or 4-6 mm. long; awns of the pappus much longer than the width of the achene — *T. grácile*
2. Rays usually present, 12-15 mm. long; awns of the pappus shorter than the width of the achene, or none
   a. Awns or scales of the pappus 2; lobes of disk-corolla linear to lanceolate, longer than the throat — *T. trífidum*
   b. Pappus a tiny 4-5-toothed crown or none; lobes of disk corollas oblong to ovate, shorter than the throat — *T. subnúdum*

TOWNSÉNDIA Hooker 1834 TOWNSENDIA
(Named for Townsend, an American botanist)

Heads with pink, purple or white pistillate ray-flowers, disk-flowers mostly perfect, achenes of the disk compressed, those of the rays usually 3-angled, pappus of bristles or scales or both; receptacle flat, without chaff, involucre hemispheric to bell-shaped, bracts imbricated in several rows; heads solitary on the branches; leaves alternate or basal, entire; tufted perennials.

1. Bracts of the involucre tapering to a long point
   a. Stem with many spreading branches from the base; pappus of the ray flower a crown of short scales — *T. grandiflóra*
   b. Stem erect, not branched at base; pappus with 2 awns or wholly of bristles
      (1) Pappus wholly of bristles; stem 1-8 in. or lacking — *T. párryi*
      (2) Pappus a crown of scales with 2 awl-shaped awns; stems 6-15 in. high — *T. exímia*
2. Bracts of the involucre short-pointed, acute or obtuse
   a. Stems 1-10 in. high, at least when mature; leaves and stems gray-hairy
      (1) Leaves spatulate; pappus of ray flower of both bristles and scales — *T. wátsoni*
      (2) Leaves narrowly oblanceolate to linear; pappus almost wholly of bristles or scales
         (a) Pappus of the ray flower of many bristles; stems 1-5 in. high — *T. incána*

(b) Pappus of the ray flower of scales and 1-2 bristles; stems finally 4-10 in. high *T. strigósa*

b. Stems none, or less than an inch high at maturity

(1) Plants gray or white-hairy

(a) Leaves linear, closely and finely gray-hairy; heads 12-20 mm. high *T. exscápa*

(b) Leaves spatulate, densely woolly; heads 7-10 mm. high *T. spathuláta*

(2) Plants green, hairy to smooth

(a) Heads 2-3 cm. high, without the rays *T. rothróckí*

(b) Heads 6-12 mm. high

x. Leaf blades hairy; heads 10-12 mm. high *T. scapígera*

y. Leaf blades smooth; heads 5-8 mm. high *T. glabélla*

Tragopógon Linné 1753 Salsify, Goatsbeard

(Gr. *tragos*, goat, *pogon*, beard, from the pappus)

Pl. 37, fig. 5.

Heads with yellow or purple perfect strap-flowers, achenes linear, round or 5-angled, ribbed, with a long beak, pappus of brownish, plumy, interwoven bristles; receptacle flat, without chaff, involucre cylindric or bell-shaped, the equal bracts in 1 row; heads solitary; leaves alternate, entire; biennial or perennial.

1. Heads purple; bracts of the involucre much longer than the flowers *T. porrifólius*
2. Heads yellow; bracts of the involucre equalling or shorter than the flowers *T. praténsis*

Vernónia Schreber 1791 Ironweed

(Named for Vernon, an English botanist)

Heads without rays, the tube-flowers usually purple, perfect, achenes ovate to oblong, 8-10-ribbed, pappus mostly of hair-like bristles; receptacle flat, without chaff, involucre hemispheric to oblong, the bracts imbricated in several to many rows; heads in panicled cymes; leaves usually alternate, simple; perennial.

Leaves linear to lance-oblong, spiny-toothed to nearly entire; heads 6-10 mm. high *V. fasciculáta*

WYÉTHIA Nuttall 1834

(Named for Wyeth, a botanical collector)

Heads with yellowish or white pistillate rays, the latter sometimes with sterile filaments, disk-flowers yellow, perfect, achenes oblong, 4-5-angled, pappus a fringed or 5-10-toothed crown, 1 or more of the teeth often awn-like; receptacle convex, with chaff, involucre bell-shaped, the bracts in 2-3 rows; heads solitary; leaves alternate, usually entire; perennial.

1. Rays white to straw-color — *W. helianthoides*
2. Rays bright yellow
   a. Rays 2.5-4 cm. long
      (1) Plants smooth throughout — *W. amplexicaúlis*
      (2) Plants hairy — *W. arizónica*
   b. Rays 10-15 mm. long; plants rough — *W. scábra*

XÁNTHIUM Linné 1753 COCKLEBUR

(Gr. *xanthos*, yellow, from yielding a yellow dye)

Heads without rays, monoecious, staminate heads densely clustered at the ends of branches, the involucre of 1-3 rows of bracts, receptacle cylindric, chaffy, corolla present; pistillate heads axillary, forming a closed involucre, 1-2-beaked and covered with hooked spines, with 2 achenes, pappus none; leaves alternate, lobed or toothed; annual.

Stems 1-6 ft. high; leaves ovate to rounded; bur 2-2.5 cm. long, with hooked or curved beak — *X. canadénse*

XIMENÉSIA Cavanilles 1793

(Named for Ximenes, a Spanish physician)

(Verbesina L.)

Pl. 40, fig. 5.

Heads with yellow pistillate ray-flowers, disk-flowers yellow, perfect, achenes flat, winged, pappus of 2 awns or in the ray of 1-3 awns; receptacle convex, with chaff, involucre hemispheric, the bracts more or less imbricated, equal and spreading; heads solitary or few; leaves alternate or sometimes opposite, simple, toothed; annual.

Stems 1-3 ft. high; leaves ovate and heart-shaped to lance-ovate, 2-5 in. long; rays 12-15, about an inch long — *X. encelioídes*

ALISMALES ARROWHEAD ORDER

ALISMACEAE ARROWHEAD FAMILY

Sepals 3, green, petals 3, colored, stamens 6-many, pistils many or rarely few, fruit an achene; flowers perfect, monoecious or dioecious, in racemes or panicles; aquatic or marsh herbs with leafless stems and basal simple leaves.

1. Flowers perfect; leaves not arrow-shaped — Alisma
2. Flowers monoecious or dioecious; leaves arrow-shaped — Sagittaria

Alísma Linné 1753 Water Plantain
(Name of uncertain origin and meaning)

Sepals 3, green, petals 3, white or rose-tinted, stamens 6-9, pistils usually 12-18, achenes flattened, curved and ribbed; flowers many in panicle-like clusters; leaves erect or floating, ovate to lance-linear; perennial.

Flower-stalks 1-4 ft. high; leaves ovate to elliptic; flowers 5-7 mm. wide — *A. plantago-aquática*

Sagittária Linné 1753 Arrowhead
(Lat. *sagitta*, arrow, from the shape of the leaf)
Pl. 44, fig. 2.

Sepals 3, green, petals 3, white, stamens usually numerous, pistils numerous, achenes flattened in rounded heads; flowers monoecious or dioecious, in whorls of 3's, staminate usually above; leaves basal, arrow-shaped, or the blade lost; aquatic or marsh perennial.

1. Basal lobes of the leaf lance-linear, forming ⅔ to ¾ the length of the whole leaf — *S. longilóba*
2. Basal lobes more or less triangular and broad, forming ¼ to ½ the length of the whole leaf
   a. Beak of the achene more than ¼ its length — *S. latifólia*
   b. Beak of the achene less than ¼ its length — *S. arifólia*

TYPHACEAE CAT-TAIL FAMILY

Sepals none, and petals reduced to bristles, stamens 2-7, filaments united. pistil 1, stalked, ovary 1-2-celled, styles 1-2, bristly hairs among the stamens and pistils; flowers monoecious in dense terminal spikes, staminate spike above the pistillate; marsh or aquatic plants with creeping root-stocks and erect cylindric stems and long-linear, flat, sword-like leaves, sheathing at the base.

Týpha Linné 1753 Cat-tail
(The Greek name)

Characters of the family.

1. Leaves 6-12 mm. wide; spikes dark brown to black, often 1 in. or more wide, the pistillate and staminate parts usually touching; stigmas spatulate or rhomboid — *T. latifólia*

2. Leaves 4-12 mm. wide; spikes light brown, staminate and pistillate parts usually separate, 4-15 mm. wide; stigmas linear to linear-oblong *T. angustifólia*

SPARGANIÁCEAE BUR-REED FAMILY

Sepals and petals reduced to a few chaffy scales, stamens usually 5, filaments distinct, ovary usually 1-celled, fruit nut-like; flowers monoecious, densely crowded in round heads, staminate heads above, spathes linear, just below or some distance below the heads; marsh or aquatic plants with creeping rootstocks, erect or floating stems, and alternate, linear, sheathing leaves.

SPARGÁNIUM Linné 1753 BUR-REED

(Gr. *sparganon,* band, from the ribbon-like leaves)

Pl. 44, fig. 4.

Characters of the family.

1. Nut-like fruits sessile, angled; fruiting heads 2-3 cm. wide *S. eurycárpum*
2. Nutlets stalked, round or spindle-shaped; fruiting heads 4-20 mm. wide
   a. Flower cluster branched; fruiting heads 1-2 cm. wide *S. andrócladum*
   b. Flower cluster simple
      (1) Staminate heads 4-6, pistillate heads 2-6, the latter 10-15 mm. wide in fruit *S. símplex*
      (2) Staminate heads 1-2, pistillate heads 1-3, the latter 4-10 mm. wide in fruit *S. mínimum*

NAIADÁCEAE PONDWEED FAMILY

Sepals and petals, or perianth, 4 or none, stamens usually 1-4, pistils 1-9, ovary 1-celled, carpels usually 1-seeded, rarely splitting; flowers perfect, monoecious or dioecious, axillary or in spikes; aquatic plants with submerged leafy stems and alternate or opposite leaves.

1. Leaves alternate; flowers perfect; stamens 2 or 4
   a. Perianth of 4 parts POTAMOGETON
   b. Perianth none RUPPIA
2. Leaves mostly opposite or clustered; flowers monoecious or diocious; stamen 1
   a. Leaves entire; flowers clustered ZANNICHELLIA
   b. Leaves spiny-toothed; flowers solitary NAIAS

NÁIAS Linné 1753 NAIAS

(Gr. *naias*, water-nymph, from the habitat)

Perianth of the staminate flower double, outer entire or 4-horned, the inner hyaline, adhering to the single anther, pistillate flower a single ovary with 2-4 stigmas, carpel solitary; flowers monoecious or dioecious, solitary, axillary; leaves usually opposite or whorled, sheathing at base; submerged aquatic.

1. Leaves tapering to a point, 12-25 mm. long, 1-2 mm. wide — *N. flexilis*
2. Leaves rather obtuse at tip, 1-2 cm. long, .5-1 mm. wide — *N. guadaloupensis*

POTAMOGÉTON Linné 1753 PONDWEED

(Gr. *potamos*, river, *geiton*, neighbor, from the habitat)

Pl. 44, fig. 1.

Perianth of 4 parts, stamens 4, pistils 4, separate, fruit of 4 1-seeded drupelets; flowers perfect, green or red, in spikes; leaves alternate or the uppermost opposite, usually of 2 kinds, submerged and floating; submerged or floating aquatic.

1. Stems with both floating and submerged leaves
   a. Submerged leaves with the flat blade present
      (1) Submerged leaves of 2 forms, elliptic and lanceolate — *P. amplifolius*
      (2) Submerged leaves alike
         (a) Submerged leaves linear
            x. Leaves thread-like with attached stipules — *P. diversifolius*
            y. Leaves lance-linear with free stipules — *P. heterophyllus*
         (b) Submerged leaves not linear
            x. Some or all of the leaves petioled
               (x) Upper leaves petioled, lower sessile; floating leaves spatulate to oblanceolate — *P. alpinus*
               (y) All the leaves petioled; floating leaves elliptic — *P. lonchites*
            y. All the leaves sessile or short-petioled — *P. zizi*
   b. Submerged leaves without the usual flat blade; floating leaves ovate to elliptic — *P. natans*
2. Stems without floating leaves
   a. Leaves lanceolate to ovate
      (1) Leaves heart-shaped and perfoliate — *P. perfoliatus*

(2) Leaves tapering to the base; sessile or short-petioled *P. lúcens*

b. Leaves linear

(1) Leaves 1-3 in. long; stipules free

(a) Leaves with 2 glands at the base, 1 mm. wide *P. pusíllus*

(b) Leaves without glands at the base, 1-2 mm. wide *P. foliósus*

(2) Leaves 2-12 in. long; stipules attached

(a) Stigma sessile or nearly so *P. filifórmis*

(b) Stigma on a distinct style *P. pectinátus*

RÚPPIA Linné 1753 RUPPIA

(Named for Rupp, a German botanist)

Perianth none, flowers 2 or more, consisting of 2 stamens and 4 pistils, cluster enclosed at first in the sheath-like base of the leaf, fruit a drupe, each on a slender stalk which, like the stalk of the spadix, appears after flowering; leaves alternate, hair-like, sheathing at the base; submerged aquatic in salt or alkaline water.

Stems 2-3 ft. long; leaves 1-3 in. long, .5 mm. or less wide; pedicels 4-6 in a cluster, the peduncle coiled *R. marítima*

ZANNICHÉLLIA Linné 1753 ZANNICHELLIA

(Named for Zannichelli, an Italian botanist)

Perianth none, flowers monoecious, 1 staminate and 2-5 pistillate flowers in the same axil, stamen 1, pistil 1, fruit a ribbed or toothed nutlet; flowers and leaf-buds at first enclosed in an envelope; leaves thread-like, whorled; submerged aquatic.

Leaves 1-3 in. long, .5 mm. or less wide; fruits 2-6 in a cluster, 2-4 mm. long *Z. palústris*

JUNCAGINACEAE ARROW GRASS FAMILY

Perianth usually of 6 parts, in 2 rows, greenish, stamens 3-6, pistils 3-6, united, separating into 3-6 carpels when ripe; flowers in terminal spikes or racemes on long leafless stalks; marsh herbs with basal, half-round leaves, sheathing below.

TRIGLÓCHIN Linné 1753 ARROW GRASS

(Gr. *tri-*, three, *glochin*, point, from the 3-pointed fruit)

Pl. 44, fig. 3.

Characters of the family.

1. Carpels 3; fruit linear or club-shaped, tapering to the base *T. palústris*
2. Carpels 6; fruit oblong or ovoid, base broad *T. marítima*

LILLIALES LILY ORDER

COMMELINACEAE SPIDERWORT FAMILY

Sepals 3, green, petals 3, colored, stamens usually 6, ovary 2-3-celled, stigma entire or slightly 2-3-lobed, capsule 2-3-celled, splitting; flowers in cymes, usually with leafy bracts; perennial or annual herbs with regular or irregular, perfect flowers and alternate, entire, sheathing leaves.

1. Flowers regular; stamens with anthers usually 6; bracts leaf-like TRADESCANTIA
2. Flowers irregular; stamens with anthers usually 3; bracts spathe-like COMMELINA

COMMELÍNA Linné 1753 DAY FLOWER

(Named for Commelin, a Dutch botanist)

Sepals 3, somewhat unequal, petals 3, blue, one of them smaller, stamens with anthers 3, rarely 2, imperfect stamens usually 3, filaments smooth, capsule 3-celled, 3-6-seeded; flowers in cymes with spathe-like bracts; leaves alternate, entire, sheathing; perennial.

Stems 1-3 ft. high; leaves lanceolate or lance-linear, 3-5 in. long; flowers about 1 in. wide *C. virgínica*

TRADESCÁNTIA Linné 1753 SPIDERWORT

(Named for Tradescant, an English gardener)

Pl. 42, fig. 2.

Sepals 3, green, petals 3, blue, purple or pink, rarely white, alike, stamens 6, ovary 3-celled, capsule 3-celled, 3-12-seeded; flowers in terminal or axillary umbels, usually with leaf-like bracts; leaves alternate, narrow, long and entire; perennial.

Stems .5-4 ft. tall; leaves linear- to lance-linear, smooth and glaucous to hairy; flowers 1-2 in. wide *T. virginiána*

LILIACEAE LILY FAMILY

Sepals 3, usually colored like the petals, petals 3, usually separate, sometimes united, stamens 6, ovary 3-celled, styles separate or united, stigma 3-lobed or globose, fruit a capsule; flowers usually perfect, solitary or in racemes, umbels or panicles; stemless or leafy-stemmed perennials from

bulbs or corms, or sometimes from rootstocks, often with long, grass-like leaves.

1. Styles distinct
   a. Leaves broad, ovate to oblanceolate; stems leafy; flowers greenish — VERATRUM
   b. Leaves linear or grass-like; flowers yellow or white
      (1) Flowers yellow; stems sticky-hairy — TOFIELDIA
      (2) Flowers white; stems not sticky-hairy
         (a) Leaves needle-shaped, 2 mm. wide or less; rare — XEROPHYLLUM
         (b) Leaves linear, 4-15 mm. wide; common — ZYGADENUS
2. Styles united
   a. Flowers axillary, solitary or 1-few in a cluster
      (1) Parts of the perianth separate; leaves heart-shaped and clasping at base — STREPTOPUS
      (2) Parts of the perianth united into a cylindric tube; leaves not heart-shaped and clasping — POLYGONATUM
   b. Flowers terminal
      (1) Flowers on a leafy stem
         (a) Flowers white or whitish to lilac
            x. Flowers in a raceme or panicle — WAGNERA
            y. Flowers solitary or 2-3 in an umbel
               (x) Flowers nodding; leaves ovate to lance-oblong — DISPORUM
               (y) Flowers erect; leaves linear, grass-like
                  m. Flowers 1-3 in. wide; petals fringed at base — CALOCHORTUS
                  n. Flowers 1-2 cm. wide; petals not fringed — LLOYDIA
         (b) Flowers yellow to orange or purple
            x. Flowers erect, orange, 2-3 in. wide — LILIUM
            y. Flowers nodding, purple or yellow and purple-dotted, 1 in. wide or less — FRITILLARIA
      (2) Plants stemless
         (a) Leaves stiff, spiny-pointed, 1-3 ft. long; flowers white in a long raceme — YUCCA
         (b) Leaves not stiff and spiny-pointed
            x. Flowers yellow, nodding — ERYTHRONIUM

PLATE 42

LILY FAMILY

1. Allium cernuum: Onion
3. Erythronium parviflorum: Spring Lily, Dogtooth Violet
4. Lilium philadelphicum: Lily
5. Zygadenus elegans
6. Calochortus gunnisoni: Mariposa Lily

SPIDERWORT FAMILY

2. Tradescantia virginiana: Spiderwort

1
2
3
4
5
6

y. Flowers white to pink or blue
  (x) Flowers in a raceme, blue or white — QUAMASSIA
  (y) Flowers in an umbel
    m. Flowers blue — BRODIAEA
    n. Flowers white to pink
      (m) Flowers with a tube 1-2 in. long, few from an underground rootstock — LEUCOCRINUM
      (n) Flowers without a tube, many on a long stalk — ALLIUM

ÁLLIUM Linné 1753 ONION

(Lat. name of the garlic)

Pl. 42, fig. 1.

Sepals and petals 3 each, similar, stamens 6, ovary 3-celled, stigmas small, ovules 1-6 in each cell; flowers white to rose, in a simple terminal umbel, with 2-3 papery bracts; leaves basal, narrowly linear, sheathing; bulbous perennial.

1. Leaves hollow, terete; flowers rose-color, longer than their pedicels; parts of the perianth 8-12 mm. long — *A. sibíricum*
2. Leaves not hollow
  a. Flowers mostly replaced by little bulbs — *A. canadénse*
  b. Flowers rarely replaced by little bulbs
    (1) Flower-umbel nodding; each valve of the capsule with 2 short crests — *A. cérnuum*
    (2) Flower-umbel erect
      (a) Each valve of the capsule with 2 crests — *A. reticulátum*
      (b) Valves of the capsule not crested
        x. Coats of the bulb very fibrous and net-like; perianth parts 6 mm. long — *A. nuttálli*
        y. Coats of the bulb thin and papery, never fibrous; perianth parts 8-12 mm. long
          (x) Bulb oblong with a rootstock below — *A. brevístylum*
          (y) Bulb small and nearly round
            m. Leaves longer than the short flower-stem; perianth parts acute — *A. brandégei*
            n. Leaves shorter than the flower-stem; perianth parts with pointed, recurved tips — *A. acuminátum*

BRODIAÉA Smith 1811

(Named for Brodie, a Scotch botanist)

Sepals and petals each 3, similar, blue, stamens 6, ovary 3-celled, style 1; flowers in terminal umbels with several bracts; leaves basal, linear; perennial stemless herb from corm-like bulb.

Flower-stem 1-2 ft. high; tube of the flower about equalling the lobes — *B. douglási*

CALOCHÓRTUS Pursh 1814 MARIPOSA LILY

(Gr. *kalos,* beautiful, *chortus,* herb)

Pl. 42, fig. 6.

Sepals 3, narrow, green, petals 3, white to purple, glandular and hairy at base, stamens 6, ovary 3-celled, style short or none, stigmas 3, recurved; flowers solitary or 1-3; leaves alternate, long-linear; perennial with a corm.

1. Gland across the base of each petal oblong; anthers acute — *C. gunnisóni*
2. Gland round or oval; anthers obtuse — *C. nuttálli*

DISPÓRUM Salisbury 1812

(Gr. *di,* two, *spora,* seed, referring to the 2 ovules in each cell)

Sepals and petals 3 each, similar, whitish or greenish-yellow, stamens 6, ovary 3-celled, style 1, stigma entire or 3-cleft; flowers terminal, solitary or few in a simple umbel; leaves alternate, broad, sessile or clasping; perennial from a rootstock.

Stems 1-2 ft. high; leaves ovate to lance-oblong, 1.5-3.5 in. long; flowers 8-15 mm. long — *D. trachycárpum*

ERYTHRÓNIUM Linné 1753 SPRING LILY, DOGTOOTH VIOLET

(Gr. *erythros,* red, from the color of the European species)

Pl. 42, fig. 3.

Sepals and petals 3 each, similar, yellow, stamens 6, ovary 3-celled, style 1, stigma 3-lobed; flowers nodding, solitary or 1-5; leaves in pairs below the middle and appearing basal, usually lance-oblong; perennial from a corm.

Flower-stem 4-12 in. high; leaves oblong, more or less tapering; flowers solitary or 2-5, 2-3 cm. long — *E. parviflórum*

FRITILLÁRIA Linné 1753 FRITILLARIA

(Lat. *fritillus,* dice-box)

Sepals and petals 3 each, yellow or purple, with a nectary at base, stamens 6, ovary 3-celled, style 1, stigma 3-lobed; flowers nodding, solitary or few in a raceme; leafy-stemmed perennial from a bulb.

1. Flowers purple and mottled — *F. atropurpúrea*
2. Flowers yellow or orange, tinged with purple — *F. pudica*

LEUCOCRÍNUM Nuttall 1837 SAND LILY

(Gr. *leukos,* white, *krinon,* lily)

Pl. 44, fig. 8.

Sepals and petals 3 each, white, similar, linear-oblong, forming a long tube, stamens 6 near the top of the tube, ovary 3-celled, style 1; flowers in an umbel, from the rootstock; leaves basal, linear, from a rootstock.

Leaves 2-10 in. long; flower-tube 1-2 in. long . *L. montánum*

LÍLIUM Linné 1753 LILY

(The Latin name)

Pl. 42, fig. 4.

Sepals and petals 3 each, reddish-orange, similar, wth a nectar-groove at base, stamens 6, ovary 3-celled, style 1, stigma 3-lobed; flowers solitary, or few, terminal; leaves whorled or alternate; leafy-stemmed perennial from a bulb.

Stems 1-3 ft. high; leaves lanceolate, 1-4 in. long; flowers 2-4 in. long — *L. philadélphicum*

LLÓYDIA Salisbury 1812

(Named for Lloyd, an English botanist)

Pl. 44, fig. 9.

Sepals and petals 3 each, white, similar, stamens 6, ovary 3-celled, style 1; flower usually solitary, erect; leaves alternate, thread-like, the bases papery; stems from a bulb with a rootstock.

Stems 2-8 in. high; flowers 1-2 cm. wide; at 10-14000 ft. — *L. serótina*

POLYGONÁTUM Adanson 1763 SOLOMON'S SEAL

(Gr. *polys,* many, *gonu,* knee, from the joints of the rootstock)

Sepals and petals united into a 6-lobed tube, greenish, stamens 6 on the tube, ovary 3-celled, style 1, fruit a berry; flowers axillary, 2-10 in an umbel; leaves ovate to lance-oblong, alternate, sessile; leafy-stemmed from a horizontal rootstock.

Stems 2-8 ft. high; leaves ovate to lanceolate, 2-6 in. long; flowers 1-2 cm. long — *P. commutátum*

QUAMÁSIA Rafinesque 1818 WILD HYACINTH

(Latinized from Quamash, the Indian name)

Sepals and petals 3 each, blue or white, similar, stamens 6, ovary 3-celled, style 1, stigma 3-lobed; flowers in a terminal raceme; leaves basal, linear; stemless perennial from an edible bulb.

Flower-stems 1-2 ft. high; raceme 3-8 in. long; flowers 1-2 cm. long — *Q. hyacinthina*

STRÉPTOPUS Michaux 1803 TWISTED STALK

(Gr. *streptos,* twisted, *pous,* foot, from the twisted flower-stalk)

Pl. 44, fig. 11.

Sepals and petals 3 each, greenish or purplish, similar, stamens 6, ovary 3-celled, style 1, fruit a berry; flowers solitary or 2 together, axillary, nodding; leaves alternate, broad, clasping; leafy-stemmed herb from a rootstock.

Stems 1-5 ft. high with spreading branches; leaves ovate to lance-oblong, 2-5 in. long; flowers 8-15 mm. long — *S. amplexifolius*

TOFIÉLDIA Hudson 1778 ASPHODEL

(Named for Tofield, an English botanist)

Petals and sepals 3 each, white or green, similar, stamens 6, ovary 3-celled, 3-lobed at tip, styles 3, capsule 3-lobed and 3-beaked, many-seeded; flowers in a terminal raceme, usually with bractlets; leaves basal, 2-ranked, linear; stemless perennial from a rootstock.

Stems .5-2 ft. high, 2-4-leaved near base; leaves 2-7 in. long; flowers 6-8 mm. wide — *T. glutinosa*

VERÁTRUM Linné 1753 FALSE HELLEBORE

(Lat. name of the hellebore)

Pl. 44, fig. 7.

Sepals and petals 3 each, greenish-white, similar, stamens 6, ovary 3-celled, styles 3, capsule 3-lobed, seeds broadly winged; flowers monoecious or polygamous in large, terminal panicles; leaves alternate, broad, clasping; stem perennial from a poisonous rootstock.

Stems 2-8 ft. high; leaves lanceolate, 6-12 in. long; panicle 1-3 ft. long; flowers 16-25 mm. wide — *V. viride*

Wágnera Adanson 1763 Spikenard, Solomon's Seal
(Smilacina Desf.)
Pl. 44, fig. 10.

Sepals and petals 3 each, white or greenish-white, similar, stamens 6, ovary 3-celled, style 1, stigma 3-lobed, fruit a berry; flowers in a terminal raceme or panicle; leaves alternate, broad, usually sessile; leafy-stemmed perennial from a rootstock.

1. Flowers in a simple raceme
   a. Flower-stalk short, little if at all longer than the flowers and the fruit; leaves lanceolate, acute — *W. stellàta*
   b. Flower-stalk 2-3 times as long as the flowers and the fruit; leaves lance-linear, long-pointed — *W. sessilifólia*
2. Flowers in a panicle
   a. Leaves short-petioled — *W. racemósa*
   b. Leaves sessile, clasping — *W. amplexicaúlis*

Xerophýllum Michaux 1803 Turkey Beard
(Gr. *xeros*, dry, *phyllon*, leaf)

Sepals and petals 3 each, white, similar, persisting when dry, stamens 6, ovary 3-celled, styles 3; flowers many in a dense terminal raceme; leaves long and needle-like; leafy-stemmed perennial from a woody rootstock.

Stems 2-5 ft. high, densely leafy below; leaves 6-18 in. long, 1-2 mm. wide; flowers 5-6 mm. long — *X. asphodeloídes*

Yúcca Linné 1753 Spanish Bayonet
(The Haytian name)

Sepals and petals 3 each, white to cream-color, similar, stamens 6, ovary 3-celled, style 1, stigmas 3, fruit fleshy; flowers large, nearly globose, nodding in a terminal raceme or panicle; leaves basal, long, lance-linear, stiff and sharp-pointed, evergreen; stem woody, underground.

1. Leaves usually 1-5 cm. wide
   a. Fruit an erect, brown, splitting capsule — *Y. harrimániae*
   b. Fruit a fleshy, edible, purple berry — *Y. baccáta*
2. Leaves .5-1 cm. wide; fruit an erect capsule — *Y. glaúca*

Zygadénus Michaux 1803 Zygadenus
(Gr. *zygon*, yoke, *aden*, gland)
Pl. 42, fig. 5.

Sepals and petals 3 each, white, yellowish or greenish, similar, with

1-2 glands at the base, stamens 6, ovary 3-celled, styles 3, capsule 3-lobed; flowers perfect or polygamous, in a terminal raceme or panicle; leaves alternate, linear; leafy-stemmed perennial from a bulb or rootstock.

1. Perianth grown together with the base of the ovary; gland heart-shaped — *Z. élegans*
2. Perianth free from the ovary; gland ovate to rounded
   a. Parts of the perianth with a claw; stamen filaments attached to the base of the perianth
      (1) Flowers 4-6 mm. long; leaves 4-6 mm. wide — *Z. venenósus*
      (2) Flowers 5-8 mm. long; leaves 5-9 mm. wide — *Z. intermédius*
   b. Parts of the perianth without a claw, 6-10 mm. long; stamen filaments free from the perianth — *Z. nuttálli*

SMILACACEAE . SMILAX FAMILY

Sepals and petals 3 each, greenish, similar, stamens 6, ovary 3-celled, stigmas 1-3, fruit a berry; flowers dioecious in axillary umbels; leaves alternate, net-veined, several-ribbed; vines with woody or herbaceous, usually prickly stems.

Smílax Linné 1753 Greenbrier

(Gr. name of the bindweed)

Characters of the family.

Stems 3-6 ft. high; leaves ovate or lance-ovate, 7-9-ribbed, 2-5 in. long; berries blue-black — *S. herbácea*

JUNCACEAE . RUSH FAMILY

Perianth of 6 parts, in 2 rows, stamens 3 or 6, pistil 1- or 3-celled, stigmas 3, fruit a capsule; flowers small, regular, greenish, mostly in compound umbels, panicles or corymbs, or densely crowded into spikes or heads; grass-like perennials, rarely annuals.

1. Sheaths of the leaves closed; capsule 3-seeded — Juncodes
2. Sheaths of the leaves open; capsule many-seeded — Juncus

Juncódes Adanson 1763 Wood Rush

(Lat. *juncus*, rush, Gr. *eidos*, like)

(Luzula D.C.)

Perianth of 6 similar, greenish-brown parts, stamens 6, ovary 1-celled, seeds 3; flowers with bracts, in open or spike-like clusters; leaves grass-like; perennial.

1. Flowers in an open panicle; stems 1-4 ft. high — *J. parviflórum*
2. Flowers in a head or spike
   a.. Spikes 1-2, nodding — *J. spicátum*
   b. Heads 2-several, erect — *J. intermédium*

JUNCUS Linné 1753 RUSH

(Lat. *juncus*, rush, from *jungo*, bind, from their use)

Pl. 44, fig. 12, 13.

Perianth of 6 similar, greenish-brown parts, stamens 6 or 3, ovary 1-celled or 3-celled, stigmas 3, capsule usually many-seeded; flowers small, yellow, greenish, in panicles or corymbs or in dense heads or spikes; leaves terete, channelled or grass-like; perennial.

1. Leaves with internal cross-walls showing as bands or knots, especially when the leaf is pinched in the fingers
   a. Leaves roundish, or but slightly flattened
      (1) Stamens 3; seeds tailed — *J. tweédyi*
      (2) Stamens 6; seeds merely pointed
         (a) Parts of the perianth and capsule pointed or acute
            x. Inner perianth parts longer than the outer — *J. nodósus*
            y. Inner perianth parts shorter than the outer
               (x) Capsule with beak a little longer than the perianth — *J. tórreyi*
               (y) Capsule with beak shorter than the perianth — *J. nevadénsis*
         (b) Parts of the perianth and capsule obtuse — *J. richardsoniánus*
   b. Leaves distinctly flattened and equitant
      (1) Stamens 3 — *J. ensifólius*
      (2) Stamens 6
         (a) Heads solitary — *J. mertensiánus*
         (b) Heads 2 or more — *J. saximóntanus*
2. Leaves without knots or cross bands
   a. Flower-cluster terminal
      (1) Flowers solitary in panicles
         (a) Stems much branched and leafy — *J. bufónius*
         (b) Stems not branched, naked
            x. Leaves flat

(x) Parts of the perianth greenish; capsule shorter than the perianth — *J. ténuis*
(y) Parts of the perianth brown; capsule equalling the perianth — *J. confúsus*
y. Leaves terete — *J. váseyi*
(2) Flowers in heads
(a) Leaves flat
x. Stamens 3 — *J. marginátus*
y. Stamens 6 — *J. longístylis*
(b) Leaves hollow and tube-like
x. Head usually single, 3-flowered; leaves flattened above — *J. triglúmis*
y. Heads 1-3, 3-12-flowered; leaves terete above — *J. castáneus*
b. Flower-cluster lateral and sessile; stems leafless
(1) Cluster usually of 1-3 flowers
(a) Stems entirely without leaves — *J. subtriflórus*
(b) Stems somewhat leafy
x. Capsule blunt, equalling the perianth — *J. hálli*
y. Capsule pointed, longer than the perianth — *J. párryi*
(2) Cluster of several to many flowers
(a) Perianth and capsule brown; capsule long-pointed — *J. bálticus*
(b) Perianth and capsule green; capsule barely pointed — *J. filifórmis*

PONTEDERIÁCEAE PICKEREL WEED FAMILY

Perianth of 6 parts, corolla-like, nearly regular, stamens 3, ovary more or less 3-celled, stigma 3-lobed, fruit a many-seeded capsule enclosed in the withered perianth-tube; flowers 1-several, enclosed by a spathe; bog or aquatic perennials with petioled leaves with broad blades, or grass-like.

HETERÁNTHERA Roemer and Schultes 1794 MUD PLANTAIN

(Gr. *heteros,* different, *anthera,* anther)

Characters of the family.

Stems 6-15 in. long; leaves ovate, about 1 in. long; flowers white or blue — *H. límosa*

ARALES ARUM ORDER

LEMNACEAE DUCKWEED FAMILY

Flowers rarely seen, consisting of a single stamen or a single pistil, fruit a 1-6-seeded utricle; flowers monoecious, 1 or more on the edge or upper surface of the plant; plant a disk-shaped or irregular leaf-like body, usually with 1-several rootlets; tiny, floating, aquatic perennials without true leaves.

LÉMNA Linné 1753 DUCKWEED

(Possibly from Gr. *limne,* lake)

Pl. 44, fig. 5, 6.

Characters of the family.

1. Plant body or thallus lanceolate, often connected in a chain — *L. trisúlca*
2. Plant body or thallus elliptic to ovoid or round
   a. Thallus 3-5-nerved
      (1) Thallus more or less strongly swollen beneath — *L. gíbba*
      (2) Thallus not swollen beneath
         (a) Thallus small, 2-3 mm. long, abruptly narrowed to a very short stalk — *L. perpusílla*
         (b) Thallus 2-6 mm. long, not abruptly narrowed to a stalk — *L. mínor*
   b. Thallus not nerved
      (1) Thallus thin, without papules; root-cap curved, tapering — *L. cyclostása*
      (2) Thallus thick, with a row of papules, root-cap scarcely curved, cylindric — *L. mínima*

HYDRALES WATERWEED ORDER

HYDROCHARITACEAE WATERWEED FAMILY

Perianth of 6 parts, in 2 rows, at least the 3 inner petal-like, stamens 9, ovary 1-celled with 3 placenta, stigmas 3, fruit closed, few-seeded; flowers dioecious or polygamous from a 2-cleft spathe; submerged plants with opposite or whorled, crowded, entire or minutely toothed leaves.

PHILÓTRIA Rafinesque 1818 WATERWEED

(Gr. *philos,* loving, *tria,* three, the leaves often in 3's)

Characters of the family.

Stems .5-3 ft. long; leaves linear to elliptic, usually 3-4 in a whorl, .5-1.5 cm. long — *P. canadénsis*

IRIDALES IRIS ORDER
IRIDÁCEAE IRIS FAMILY

Sepals and petals 3 each, similar in color, sometimes more or less united, and the tube grown to the ovary, stamens 3, inserted on the perianth, ovary usually 3-celled, style 3-cleft, the branches sometimes petal-like, capsule 3-celled, 3-angled or lobed; flowers regular or irregular, solitary or clustered, enclosed below by bracts; perennial herbs with grass-like, equitant, 2-ranked leaves.

1. Sepals and petals unlike in form; flowers 2-3 in. long; plants 1-3 ft. tall; style branches petal-like, concealing the stamens — IRIS
2. Sepals and petals alike in form; flowers 1-2 cm. long; style-branches not petal-like; stems 4-15 in. high — SISYRINCHIUM

IRIS Linné 1753 IRIS
(Gr. *iris*, rainbow, referring to the color of the flower)
Pl. 43, fig. 5.

Sepals 3, spreading or reflexed, colored like the 3 erect petals but usually broader and larger, stamens 3, ovary 3-celled, style-branches petal-like, arched over the stamens, and bearing the stigmas under the 2-lobed tips, capsule oblong or oval; flowers terminal 1-few; leaves long and grass-like, equitant; perennial herb from a rootstock.

Stems .5-3 ft. tall; flowers 1-2, pale blue, to purple, rarely white, 2-3 in. long — *I. missouriénsis*

SISYRÍNCHIUM Linné 1753 BLUE-EYED GRASS
(Gr. *sisyrinchion*, a kind of iris)
Pl. 43, fig. 1.

Sepals and petals 3 each, blue, similar, usually abruptly pointed, stamens 3, ovary 3-celled, capsule mostly globose, flowers in a terminal umbel from a pair of green bracts; leaves grass-like; perennial.

Stems 4-15 in. high, 2-edged or 2-winged; leaves mostly basal, 1-3 mm. wide; flowers 1-2 cm. wide — *S. angustifólium*

ORCHIDALES ORCHID ORDER
ORCHIDÁCEAE ORCHID FAMILY

Sepals 3, similar, petals 3, 2 alike, the third usually larger and different in form and color, forming a lip or sack, often spurred also, stamens 1-2, united with the style into a column, pollen in 2-8 pear-shaped masses, or

pollinia, attached at the base of a sticky disk, style often forming a beak at the base of the anther, stigma a sticky surface beneath the beak of the style, or in a cavity between the anther sacks, ovary below the perianth, 1-celled, many-angled, capsule 3-valved, seeds very numerous; flowers irregular, solitary or in spikes or racemes; perennial herbs with entire sheathing leaves, sometimes scale-like, arising from corms, bulbs or tuberous roots.

1. Stems reddish-brown or purplish, the leaves represented by sheathing scales; rootless, the underground stems resembling branched coral — CORALLORRHIZA
2. Stems and leaves green
   a. Flowers mostly solitary and terminal, large, rose, purple or yellow
      (1) Flower solitary, rose; lip sack-like, with a tuft of yellow hairs — CALYPSO
      (2) Flowers 1-3, yellow or purple; lip a large sack, not tufted — CYPRIPEDIUM
   b. Flowers more than 1, usually in spikes or racemes, mostly white or greenish
      (1) Leaves all basal
         (a) Basal leaf 1; flowers greenish-yellow — LYSIELLA
         (b) Basal leaves several in a close rosette; flowers white or greenish-white — PERAMIUM
      (2) Stems leafy
         (a) Leaves 2, opposite, just below the raceme — LISTERA
         (b) Leaves more than 2 and alternate
            x. Capsules erect or ascending
               (x) Flowers spirally twisted on the spike
                  m. Flowers white, fragrant — SPIRANTHES
                  n. Flowers greenish, not fragrant — PIPERIA
               (y) Flowers not spirally twisted
                  m. Petals lanceolate, lip entire — LIMNORCHIS
                  n. Petals linear or thread-like; lip lobed. — COELOGLOSSUM
            y. Capsules deflexed at maturity — EPIPACTIS

CALÝPSO Salisbury 1807 CALYPSO
(Named for the goddess, Calypso)
Pl. 43, fig. 6.

Sepals and lateral petals similar, rose, lip sack-like, 2-parted below,

PLATE 43

IRIDS—ORCHIDS

IRIS FAMILY

1. Sisyrinchium angustifolium: Blue-eyed Grass
5. Iris missouriensis: Iris

ORCHID FAMILY

2. Corallorrhiza multiflora: Coral Root
3. Cypripedium pubescens: Ladies' Slipper
4. Peramium repens: Rattlesnake Plantain
6. Calypso bulbosa

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with a patch of yellow hairs, column dilated, petal-like, the lid-like anther just below the summit, pollinia 2; flower solitary; terminal, bracted; leaf solitary, petioled, basal, the stem with 2-3 scales; perennial from a bulb.

Stems 4-8 in. high; leaf ovate to rounded, 1-2 in. long; flowers 1-2 cm. long — *C. bulbósa*

Coeloglóssum Hartman 1820

(Gr. *koilos,* hollow, *glossa,* tongue)

Sepals 3, ovate-lanceolate, the lateral petals narrow, linear or thread-like, greenish, lip oblong-spatulate, lobed at the summit, more than twice as long as the sack-like spur, pollinia with long stalks; flowers greenish in a leafy-bracted spike; leaves alternate, entire; leafy-stemmed biennial from a tuber.

Stem .5-2 ft. high; leaves lanceolate to ovate, 2-5 in. long; flowers 6-8 mm. long — *C. bracteátum*

Corallorrhíza Robert Brown 1813 Coral Root

(Gr. *corallion,* coral, *rhiza,* root)

Pl. 43, fig. 2.

Sepals 3, nearly equal, lateral petals about as long as the sepals, purple to brownish-red, lip whitish, 1-3-ridged, toothed or lobed, spotted or lined, sometimes with a sack or spur, column nearly free, slightly incurved, somewhat 2-winged, pollinia 4 in 2 pairs; flowers in terminal racemes; leaves all reduced to sheathing scales; saprophyte or root-parasite with coral-like underground stem.

1. Flowers a dull purple; lip not deeply 3-lobed
   a. Raceme 3-12-flowered; a small spur or sack attached to the summit of the ovary — *C. innáta*
   b. Raceme 10-25-flowered; spur none — *C. striáta*
2. Flowers brownish-red, 10-30 in a raceme; spur distinct, yellowish; lip deeply 3-lobed — *C. multiflóra*

Cypripédium Linné 1753 Ladies' Slipper

(Gr. *kypris,* Venus, *pedion,* boot)

Pl. 43, fig. 3.

Sepals 3, separate or two of them united under the lip, lateral petals linear to lanceolate, greenish-brown, often twisted, lip a large swollen sack, purple, yellow or white, column declined, with an anther on either side and a dilated petal-like sterile stamen above covering the summit of the style; flowers solitary or several, drooping; leaves broad, many-veined; perennial from tufted roots.

1. Flowers yellow, usually solitary
   a. Lip 1.5-3 cm. long — *C. parviflórum*
   b. Lip 3-5 cm. long — *var. pubéscens*
2. Flowers purple or yellow, 2-several in a cluster; leaves 2, opposite — *C. knightae*

Epipáctis Robert Brown 1813 Helleborine

(Greek name of a plant)

Sepals and petals separate, similar, greenish, purple-veined, lip broad, concave below, constricted near the middle, the upper part broad and petal-like, column short, erect, pollinia 2-parted; flowers few in leafy-bracted, terminal racemes; leafy-stemmed perennial from a creeping rootstock.

Stems 1-3 ft. high; leaves ovate to lanceolate; sack-like base of the lip with wing-like margins — *E. gigantéa*

Limnórchis Rydberg 1900 Green Orchid

(Gr. *limne*, lake, *orchis*, orchid)

Sepals and petals greenish, free, spreading, similar, lip linear or lanceolate, entire, the spur shorter to longer than the lip, column very short; flowers greenish to white, in terminal spikes or racemes; leaves alternate, lanceolate to ovate; perennial with fibrous or tuberous roots.

1. Flowers white; spur club-shaped, shorter than the lip — *L. boreális*
2. Flowers greenish or greenish-purple
   a. Lip 4-5 mm. long, not exceeded by the spur
      (1) Spur shorter than the lip — *L. stricta*
      (2) Spur equalling the lip — *L. viridiflóra*
   b. Lip 6-8 mm. long, exceeded by the spur — *L. sparsiflóra*

Lístera Robert Brown 1813 Twayblade

(Named for Lister, an English botanist)

Sepals and petals nearly alike, spreading or reflexed, free, anther without a lid, joined with the column, pollinia 2; flowers greenish-yellow to purplish, spurless, in terminal racemes; leaves 2, opposite, near the middle of the stem, 1-2 small scales at the base of the stem; small herb with fibrous roots.

1. Stems sticky-hairy; lip wedge-shaped, 2-lobed — *L. convallarioides*.
2. Stems smooth; lip linear, 2-cleft — *L. cordáta*

Lysiélla Rydberg 1900

(Dim. of Lysia)

Sepals and petals greenish-yellow, free, similar, spreading, lip linear-lanceolate, entire, spur shorter than the curved ovary, beak of stigma without appendages, stem with a single obovate leaf at base; low herbs from a rootstock.

Stems 2-8 in. high; leaf 2-5 in. long; flowers 5-6 mm. long, the lip deflexed — *L. obtusáta*

Perámium Salisbury 1912 Rattlesnake Plantain

(Gr. *peras,* limit, line, from the barred leaves)

Pl. 43, fig. 4.

Sepals and petals white, the upper sepal united with the 2 petals into a hood, lip entire, concave or sack-like, the apex reflexed, anther attached to the column by a short stalk, pollinia 1 in each sack; flowers in bracted spikes; leaves basal, usually splotched with white; perennial from fleshy roots.

1. Stems 3-10 in. high; leaves 1-3 cm. long; spike 1-sided; lip plainly sack-like — *P. répens*
2. Stems 8-20 in. high; leaves 3-6 cm. long; spike not 1-sided; lip hardly sack-like — *P. menziési*

Pipéria Rydberg 1901

(Named for Piper, an American botanist)

Sepals and petals greenish or white, lance-linear to ovate, truncate or hastate at base, lip oblong, obtuse, lobed near the base, stigma a small beak between the anthers, spur linear or club-shaped barely longer than the lip; flowers spirally arranged in a bracted spike; leaves mostly basal, those of the stem reduced, generally dead or withering at flowering time; herb with tuberous roots.

Stems 1-2 ft. high, leafy below; leaves oblanceolate; flowers greenish — *P. unalaschénsis*

Spiránthes Persoon 1807 Ladies' Tresses

(Gr. *speira,* spiral, *anthos,* flower)

Sepals free or united with the petals into a hood, lip concave, erect, embracing the column and often adhering to it, spreading and wavy, or toothed at the apex, column arched below, stigma ovate, extending into a pointed beak, pollinia 2; flowers white, spurless, spirally twisted in a 1-3-

PLATE 44

ARROWHEADS—SEDGES

PONDWEED FAMILY

1. Potamogeton pectinatus: Pondweed

ARROWHEAD FAMILY

2. Sagittaria arifolia: Arrowhead

ARROWGRASS FAMILY

3. Triglochin maritima: Arrow Grass

BUR-REED FAMILY

4. Sparganium simplex: Bur-reed

DUCKWEED FAMILY

5. Lemna trisulca: Duckweed
6. Lemna minor

LILY FAMILY

7. Veratrum viride: False Hellebore
8. Leucocrinum montanum: Sand Lily
9. Lloydia serotina
10. Wagnera stellata: Spikenard, Solomon's Seal
11. Streptopus amplexifolius: Twisted Stalk

RUSH FAMILY

12. Juncus balticus: Rush
13. Juncus longistylis

SEDGE FAMILY

14. Eriophorum polystachyum: Cotton Grass
15. Cyperus inflexus: Galingale
16. Scirpus pauciflorus: Dwarf Rush
17. Scirpus lacustris: Bulrush
18. Heleocharis palustris: Spike Rush
19. Elyna bellardi

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rowed spike; leaves alternate, linear to lanceolate; perennial herb with fleshy or tuberous roots.

Stems 4-15 in. high; leaves linear or linear-oblanceolate, 2-8 in. long; flowers 6-8 mm. long, white or greenish-white, fragrant — *S. stricta*

POALES GRASS ORDER

CYPERACEAE SEDGE FAMILY

Sepals and petals none or represented by bristles or scales, stamens 1-3, ovary 1-celled, style 2-3-cleft, fruit an achene; flowers perfect or staminate and pistillate, arranged in small dense clusters or spikelets, 1 or rarely 2 in the axil of each bract or glume; spikelets solitary or clustered, 1-many-flowered; leaves narrow with closed sheaths; grass-like or rush-like herbs, with usually solid, triangular, cylindric or flattened stems.

1. Flowers perfect, i. e., stamens and pistil in the axil of each scale
   - a. Spikelets flattened, with the scales in 2 rows; perianth bristles wanting — CYPERUS
   - b. Spikelets not flattened; scales roundish, imbricated all around; perianth bristles usually present
     - (1) Perianth bristles 1-many; stamens usually 3
       - (a) Bristles 1-12, usually less than 1 cm. long
         - x. Leaves usually present; base of style enlarged or narrow, falling away from the achene — SCIRPUS
         - y. Leaves reduced to a single sheath at base; base of style persisting on the achene as a tubercle — HELEOCHARIS
       - (b) Bristles usually many, 1-3 cm. long, giving the spikelets a cottony appearance — ERIOPHORUM
     - (2) Perianth bristles wanting; stamen 1 — HEMICARPHA
2. Flowers staminate or pistillate, in the same or in different spikelets
   - a. Achene enclosed in a sack or perigynium — CAREX
   - b. Achene without a perigynium — ELYNA

CÁREX Linné 1753 SEDGE

(Lat. *carex*, sedge, perhaps from Gr. *keirein*, to cut, from the sharp leaves)

Pl. 45, fig. 1-17.

Spikes (spikelets) pistillate, staminate or both pistillate and staminate, solitary or in racemes, panicles or dense clusters; perianth none, staminate flowers with 3 stamens, pistillate flowers a single pistil with style and 2-3 stigmas within a bract or perigynium, achene 3-angled or lens-shaped; flowers monoecious or dioecious, solitary in the axil of the scale; leaves 3-ranked; stems mostly 3-angled; grass-like perennials, usually from a rootstock.

1. Spike single, terminal, staminate above, pistillate below, except in dioecious plants
   - a. Stigmas 3
     - (1) Perigynia horizontal and spreading or reflexed when mature, mostly lanceolate
       - (a) Leaves flat; rootstock creeping, the stems mostly in rows — *C. nígricans*
       - (b) Leaves inrolled; stems tufted, the rootstocks matted — *C. pyrenaíca*
     - (2) Perigynia erect or ascending, not horizontal
       - (a) Perigynia rough or hairy
         - x. Spike buff, staminate and pistillate; perigynia roughened; stems tufted — *C. filifólia*
         - y. Spike purple-brown, staminate or pistillate; perigynia hairy; with creeping rootstocks — *C. scirpoídea*
       - (b) Perigynia entirely smooth
         - x. Scales 1-3 cm. long, leaf-like, hiding the large green perigynia — *C. durifólia*
         - y. Scales not large and leaf-like, less than 1 cm. long
           - (x) Stems 2-6 in. high; spikes or perigynia brown
             - m. Perigynia erect when ripe, hidden by the scales; at 11-14000 ft. — *C. rupéstris*
             - n. Perigynia spreading and visible when ripe; at 7-10000 ft. — *C. obtusáta*
           - (y) Stems 8-16 in. high; perigynia, and spikes usually green

m. Perigynia 1-2, obovate, 4-5 mm. long — *C. géyeri*
n. Perigynia 3-6, oblong, 2 mm. long — *C. leptálea*

b. Stigmas 2; spike brown, about 1 cm. long; perigynia beaked, often spreading; leaves inrolled, thread-like; stems 3-10 in. high — *C. redowskyána*

2. Spikes two or more

a. Spikes all essentially alike, both pistillate and staminate, but the latter flowers often few or inconspicuous; stigmas 2

(1) Spikes crowded in a dense round or ovoid head, or if in an oblong spike, the latter usually less than 2 cm. long

(a) Heads pale

x. Spikes of the head many; heads 1.5-2.5x1-2 cm.; perigynia beaked, hidden by the long pointed scale — *C. douglási*
y. Spikes 3-12; heads 1-1.5x1 cm.; perigynia winged, beaked, longer and broader than the acute scale — *C. arthrostáchya*

(b) Heads brown

x. Spikes 2-6

(x) Stems 2-8 in. high; leaves inrolled, thread-like

m. Spikes in a roundish head 1 cm. wide — *C. incúrva*
n. Spikes in an oblong head 1-1.5 cm. x5-8 mm. — *C. stenophýlla*

(y) Stems 8-15 in. high; leaves flat; heads 1 cm.x.5 cm. — *C. bonplándi*

y. Spikes several-many

(x) Perigynia winged

m. Heads ovoid 1.5-2 cm.x1-1.5 cm.; perigynium longer than the scale — *C. festíva*
n. Heads oblong 1-1.5 cm.x8-10 mm.; perigynium and scale about equal — *C. hoódi*

(y) Perigynia not winged, abruptly short-beaked, hidden by the scale; heads 1.5-2.5 cm. long — *C. gayána*

(2) Spikes more than 5 mm. long, densely crowded throughout or at least above,

rarely scattered, in an oblong to cylindric cluster 2-5 cm. long
(a) Perigynia winged
x. Beak nearly as long as body or longer
(x) Perigynia broadly winged — *C. siccáta*
(y) Perigynia narrowly winged — *C. leporína*
y. Beak ⅓-½ as long as body; perigynia broadly winged — *C. festucácea*
(b) Perigynia not winged, sometimes with a ridge-like margin
x. Beak 1-2 times longer than body. — *C. stipáta*
y. Beak equalling or shorter than body
(x) Beak equalling the body — *C. teretiúscula*
(y) Beak shorter than body
m. Leaves 1-3 mm. wide; scales acute or pointed — *C. muricáta*
n. Leaves 2-4 mm. wide; scales obtuse — *C. sartwélli*
(3) Spikes less than 5 mm. long, sometimes longer in C. deweyana, rarely crowded, mostly widely separated in a narrow cylindric cluster 2-7 cm.x4-8 mm.
(a) Flower cluster raceme-like, the spikes mostly 1-3-flowered, 1.5-5 mm. long; perigynia ovoid, minutely beaked, larger than the scale — *C. tenélla*
(b) Flower cluster of 3-9 distinct 3-15-flowered spikes
x. Perigynia with a beak more than one-half as long to as long as the body
(x) Perigynia spreading or reflexed when mature, 2-3 mm. long; spikes 8-15-flowered — *C. stérilis*
(y) Perigynia erect, 4-5 mm. long; spikes 3-8-flowered — *C. deweyána*
y. Perigynia 1-2 mm. long, not spreading, with a minute beak less than one-half as long as the body; spikes 10-20-flowered — *C. canéscens*
b. Terminal spike staminate or in the next often pistillate above and staminate below, the lateral spikes usually pistillate; stigmas 3

(1) Terminal staminate spike absent or inconspicuous, spikes often drooping, 2-5 in a dense head, or contiguous; the scales dark purple-brown to black; stigmas 3
  (a) Spikes round or ovoid, 7-20 mm.x5-12 mm., 1-4, usually 3 in a dense head 1-2 cm.x1-1.5 cm., often drooping — *C. atráta*
  (b) Spikes oblong to cylindric, 1-5, usually separate, 7-30 mm.x3-6 mm. wide, often long-stalked and drooping
    x. Spikes drooping, 1-3 cm.x5-6 mm. — *C. bélla*
    y. Spikes not drooping
      (x) Spikes 2-3, often crowded, 7-12 mm.x3-4 mm. — *C. alpína*
      (y) Spikes 3-5, mostly separate, 1-2 cm. x5-6 mm. — *C. raynóldsi*

(2) Terminal spike or spikes staminate, rarely partly staminate
  (a) Lateral pistillate spikelets 1-3, 1-few-flowered, 3-10 mm. long, or raceme-like and 1-2 cm. long
    x. Lateral spikelets raceme-like, .5-2 cm. long, the perigynia rarely crowded, globoid or with a tiny abrupt point, yellow to golden, smooth, ribbed — *C. aúrea*
    y. Lateral spikelets 3-8 mm. long, mostly with crowded perigynia, the latter not yellow or golden, hairy or smooth, not ribbed
      (x) Spikes erect; perigynia hairy
        m. Stems erect, with running root-stocks; perigynia 3-4 mm. long; beak about one-fourth of the body — *C. pennsilvánica*
        n. Stems densely tufted, mat-like; spikes often hidden by leaves; perigynia 1-2.5 mm. long; beak one-half to as long as body — *C. umbellàta*
      (y) Spikes nodding, 4-10 mm. long, 2 mm. wide; perigynia smooth, pale green, 2 mm. long; beak about one-third as long as body — *C. capilláris*

(b) Lateral pistillate spikelets many-flowered, cylindric, 2-8 cm. long
x. Beak conspicuously 2-toothed, the teeth often 1-2 mm. long; stigmas 3
(x) Perigynia hairy
m. Perigynia 5-8 mm. long, tapering gradually into a beak about as long as the body; teeth spreading, 1-2 mm. long — *C. aristáta*
n. Perigynia 2-4 mm. long, abruptly beaked, the beak about one-third as long as the body; teeth less than 1 mm. long — *C. lanuginósa*
(y) Perigynia smooth
m. Staminate spike usually 1; scales with a rough awn 2-4 times longer than the ovoid base — *C. hystricina*
n. Staminate spikes usually 2; scales acute or with an awn not longer than the lance-ovate base
(m) Perigynia spreading horizontally at maturity, usually 2 mm. or less wide at base — *C. utriculáta*
(n) Perigynia ascending, usually 2.5-3 mm. wide at base — *C. monile*
y. Beak minutely or not at all toothed
(x) Beak as long or longer than the body; stigmas 3
m. Spikes brown, 1-2 cm. long; perigynia densely crowded, lanceolate, tapering gradually into a beak about as long as the body — *C. abláta*
n. Spikes pale green, 2-5 cm. long; perigynia often separate, roundish, abruptly narrowed into a slender beak longer than the body — *C. longiróstris*
(y) Beak none up to one-third as long as body; stigmas 2 as a rule — *C. saxátilis*
m. Perigynia inflated; beak about as long as body

PLATE 45

SEDGES—GRASSES

SEDGE FAMILY

1. Carex tenella: Sedge
2. Carex muricata
3. Carex stenophylla
4. Carex festiva
5. Carex siccata
6–7. Carex atrata
8. Carex alpina
9. Carex festucacea
10. Carex aquatilis
11. Carex aurea
12. Carex rupestris
13. Carex pennsilvanica
14. Carex umbellata
15. Carex lanuginosa
16. Carex capillaris
17. Carex utriculata

GRASS FAMILY: BLUE-GRASS TRIBE

18. Bromus ciliatus: Brome Grass
19. Festuca ovina: Fescue
20. Panicularia nervata: Manna Grass
21. Poa pratensis: Blue-grass
22. Melica parviflora: Melic Grass
23. Distichlis spicata: Salt-grass
24. Catabrosa aquatica: Whorl Grass
25. Munroa squarrosa
26. Eragrostis major
27. Triodia acuminata
28. Koeleria cristata
29. Redfieldia flexuosa
30. Eatonia obtusata

n. Perigynia somewhat flattened; beak short or none
(m) Spikes dark brown-purple, 1-1.5 cm. long *C. tólmiei*
(n) Spikes variously green and purple, 2-4 cm. long *C. aquátilis*

Cypérus Linné 1753 Galingale

(The Greek name)

Pl. 44, fig. 15.

Spiklets flattened, scales falling away from the axis at maturity, in umbels or heads; flowers perfect, with concave or keeled, 2-ranked scales, perianth none, stamens 1-3, style 2-3-cleft; leaves more or less basal, grass-like, 1 or more of the upper leaves forming an involucre; annual or perennial with triangular stems.

1. Stems 1-6 in. high; annual; spikelets 4-6 mm. long; scales with a long, recurved point; stamen 1 *C. infléxus*
2. Stems .5-2.5 ft. high; perennial; spikelets 6-16 mm. long; scales without a recurved point; stamens 3
   a. Spikelets in 1-7 dense, globose heads *C. filicúlmis*
   b. Spikelets in loose clusters, several of which are sessile and some stalked *C. schweinítzi*

Elyna Schröter 1806 Elyna

(Gr. *elynos*, covering, perhaps from the overlapping scales)

Pl. 44, fig. 19.

Spikelets in a narrow, terminal, cylindric spike, scales of the spikelet 3-4, usually only 1 flower-bearing; perianth-bristles wanting, style 3-cleft, achene 3-angled; leaves narrowly linear, basal; tufted arctic and mountain sedges.

Stems 4-15 in. high; spike 1.5-3 cm. long; achenes 3-4 mm. long, appressed *E. bellárdi*

Eriophorum Linné 1753 Cotton Grass

(Gr. *erion*, wool, *phora*, bearing, from the cotton-like bristles)

Pl. 44, fig. 14.

Spikelets terminal, solitary or in heads or umbels, often with a 1-several-leaved involucre; flowers perfect, with spirally imbricated, usually fer-

tile scales; perianth-bristles 6-many, white or brown, 1-3 cm. long, stamens 1-3, style 3-cleft, achene 3-angled; leaves linear, stems triangular to round; bog-perennial from a rootstock.

1. Bristles 2.5-3 cm. long; achenes obovate; bracts ovate to lance-ovate; involucral leaves 2-4 *E. polystáchyum*
2. Bristles 1.5-2.5 cm. long; achenes linear-oblong; involucral leaf usually only 1 *E. grácile*

Heleócharis Robert Brown 1810 Spike Rush

(Gr. *helos*, marsh, *charis*, grace, from the habitat)

Pl. 44, fig. 18.

Spikelets solitary, terminal, without an involucre; flowers perfect, with concave, spirally imbricated scales; perianth-bristles usually 1-12, stamens 2-3, style 2-3-cleft, achenes lens-shaped or 3-angled, base of the style forming a swollen tip to the achene; leaves reduced to basal sheaths; stems simple, round, angular, flattened or grooved; annual or perennial.

1. Style 2-cleft; achenes lens-shaped or bi-convex
   a. Perennial from horizontal rootstocks
      (1) Stems 1-4 in. high; upper sheath papery *H. olivácea*
      (2) Stems .5-5 ft. high; upper sheath not papery *H. palústris*
   b. Annuals with fibrous roots
      (1) Achenes black with a low tiny tubercle *H. atropurpúrea*
      (2) Achenes brown, the large ovoid tubercle ¼ its length *H. ováta*
2. Style 3-cleft; ahenes 3-angled or swollen
   a. Stems 2-6 in. high; achenes ribbed and net-like *H. aciculáris*
   b. Stems 8-15 in. high
      (1) Bristles 2-4 or wanting, shorter than the achene; achenes roughened *H. ténuis*
      (2) Bristles 4-8, longer than the achene; achenes smooth *H. rostelláta*

Hemicárpha Nees 1834

(Gr. *hemi*, half, *karphos*, chaff, from the single inner scale or sepal)

Spikelets solitary or in heads, terminal with an involucre of 1-3 leaves; flowers perfect, scales spirally imbricated; perianth a single sepal, bristles none, stamens 1-3, style 2-cleft; leaves and stems thread-like; tufted annual sedge.

Stems 1-5 in. high; spikelets 1-4, 2-3 mm. long *H. micrántha*

Scírpus Linné 1753 Bulrush, Club Rush
(Lat. name of the bulrush)
Pl. 44, fig. 16, 17.

Spikelets solitary or in umbels, spikes or heads, usually with a 1-several-leaved involucre; flowers perfect, scales spirally imbricated all around; perianth-bristles 1-6 or occasionally none, stamens 2-3, style 2-3-cleft; leaves long-linear or often reduced to sheaths; annual or perennial.

1. Spikelet solitary and terminal
   a. Stems 3-angled, grooved, 2-8 in. high; scales lanceolate, long-pointed; bristles 2-6, spiny; achenes gray, finely netted — *S. pauciflórus*
   b. Stems round, 4-15 in. high; scales ovate, obtuse; bristles 6, smooth; achenes brown, not netted — *S. caespitósus*
2. Spikelets more than 1 as a rule, usually several-many, often lateral
   a. Spikelets 1-12 in a dense, head-like cluster
      (1) Stems round; leaves channelled or revolute; bristles 1-3, not half as long as the achene — *S. nevadénsis*
      (2) Stems triangular
         (a) Involucral leaves of head 1
            x. Scales awned; leaves 1-3 — *S. americánus*
            y. Scales short-pointed; leaves usually mere sheaths — *S. ólneyi*
         (b) Involucral leaves 2-3
            x. Bristles usually 2, twice as long as the achene — *S. paludósus*
            y. Bristles 1-3, less than half as long as the achene, or none — *S. campéstris*
   b. Spikelets many, in panicles or umbels
      (1) Stems round, leafless; cluster lateral; spikelets 5-15 mm. long; bristles 4-6, barbed, as long or longer than the achene — *S. lacústris*
      (2) Stems triangular, leafy; cluster terminal
         (a) Spikelets 15-25 mm. long; scales with a long, curved awn — *S. fluviátilis*
         (b) Spikelets 4-10 mm. long; scales without a curved awn

x. Bristles downwardly barbed
  (x) Spikelets 4-10 mm. long; bristles usually 6; styles 3 — *S. atrovírens*
  (y) Spikelets 3-4 mm. long; bristles 4; styles 2 — *S. microcárpus*
y. Bristles smooth, 6; spikelets 6-10 mm. long; styles 3 — *S. lineátus*

POÁCEAE GRASS FAMILY

Sepals and petals none, occasionally represented by bristles or scales, stamens 1-6, usually 3, styles usually 2, ovary 1-celled, fruit a seed-like grain; flowers perfect or sometimes monoecious or dioecious, or reduced to 1-2 scales, with 1-3 minute scales called lodicules, usually enclosed in 2 scales, the inner called the palet, the outer the lemna; spikelets 1-many-flowered, usually enclosed at the base by 2 scales or glumes, in racemes, panicles or spikes; leaves mostly long-linear, sheathing, the sheaths usually split to the base and bearing at the top a papery or thickened ring called a ligule; annual or perennial herbs.

1. Spikelets sessile in 2 rows in a one-sided or zig-zag spike
  a. Spikelets in one-sided spikes
    (1) Spikelets dioecious, the staminate spikes one-sided, the pistillate ball-like — BULBILIS
    (2) Spikelets perfect, the spikes alike
      (a) Spikes long and narrow, thread-like
        x. Spikes in a raceme-like cluster — SCHEDONNARDUS
        y. Spikes in a digitate cluster — DIGITARIA
      (b) Spikes not long and thread-like
        x. Plains grasses with mostly horizontal or hanging spikes — BOUTELOUA
        y. Meadow or swamp grasses with erect or ascending spikes
          (x) Spikes long, the axis extending beyond the spikelets — SPARTINA
          (y) Spikes short, the axis not extended — BECKMANNIA
  b. Spikelets alternating on opposite sides of a zig-zag, usually jointed axis
    (1) Spikelets usually single at each joint
      (a) Spikelets with the face toward the axis — AGROPYRUM
      (b) Spikelets with the edge toward the axis — LOLIUM
    (2) Spikelets usually 2-6 at each joint

(a) Spikelets 2-many-flowered, the glumes lanceolate — ELYMUS
(b) Spikelets 1-flowered, the glumes awl-shaped and in a row — HORDEUM

2. Spikelets not in 2 rows in a one-sided or zig-zag spike
a. Spikelets 2-many-flowered
(1) Lemma awned from the back
(a) Spikelets less than 1 cm. long
x. Lemma fringe-toothed or 2-toothed at tip — DESCHAMPSIA
y. Lemma 2-cleft at tip, the teeth awn-pointed
(x) Awn bent and twisted — TRISETUM
(y) Awn straight or none — GRAPHEPHORUM
(b) Spikelets more than 1 cm. long — AVENA
(2) Lemma awned from the tip or awnless
(a) Plants dioecious; lemma 3-awned — SCLEROPOGON
(b) Plants not dioecious; lemma entire or 2-lobed
x. Hairs very long and enclosing the lemma; tall swamp grasses — PHRAGMITES
y. Hairs none or shorter than the lemma
(x) Spikelets in the axils of spiny leaves; stems spreading, 1-4 in. high — MUNROA
(y) Spikelets not in the axils of spiny leaves
m. Lemma 1-3-nerved
(m) Lateral nerves of the lemma hairy
r. Spikelets appressed on the long branches of a panicle — DIPLACHNE
s. Spikelets not appressed on long branches — TRIODIA
(n) Lateral nerves not hairy
r. Lemma copiously long-hairy at base — REDFIELDIA
s. Lemma not long-hairy at base
(r) Upper glume much broader than the lower — EATONIA

(s) Upper glume similar to the lower
h. Panicle cylindric and spike-like — KOELERIA
i. Panicle with spreading branches, not spike-like
(h) Spikelets 2-flowered; water grasses — CATABROSA
(i) Spikelets 4-20-flowered; land grasses — ERAGROSTIS
n. Lemma 5-11-nerved
(m) Upper lemmas of the spikelet empty, broad and folded about each other — MELICA
(n) Upper lemmas not broad and folded together
r. Stigmas arising from the tip of the ovary
(r) Lemma flattened, keeled
h. Lemma awn-pointed; spikelets in one-sided groups — DACTYLIS
i. Lemma not awn-pointed
(h) Glumes 1-3-nerved
k. Axis of spikelet extended into a hairy tip — GRAPHEPHORUM
l. Axis of spikelet not extended into a hairy tip — POA
(i) Glumes 5-7-nerved — DISTICHLIS
(s) Lemma convex or rounded on the back
h. Lemma awned or acute
(h) Lemma 5-nerved; axis of spikelet smooth — FESTUCA
(i) Lemma 7-11-nerved; axis hairy — DANTHONIA
i. Lemma obtuse and papery at tip

(h) Lemma distinctly nerved; style present — PANICULARIA
(i) Lemma faintly nerved; style none — PUCCINELLIA
s. Stigmas arising below the tip of the ovary; spikelets large, usually awned — BROMUS
b. Spikelets 1-flowered, often with an extra or sterile lemma
(1) Spikelet with lemma and palet alone, the glumes none — HOMALOCENCHRUS
(2) Spikelet with glumes as well as lemma and palet
(a) Spikelets in pairs or threes, one stalked, the other stalkless
x. Spikelets in spike-like clustered or panicled racemes — ANDROPOGON
y. Spikelets in panicles
(x) Stalked spikelet reduced to a pedicel — CHRYSOPOGON
(y) Stalked spikelet present — SORGHUM
(b) Spikelets not in pairs
x. Two extra glumes or hairy stalks between the glumes and the lemma and palet
(x) Spikelets with a perfect flower alone — PHALARIS
(y) Spikelets with 1 perfect and 2 staminate flowers — HIEROCHLOE
y. Spikelets without 2 extra glumes
(x) Lemma and palet hyaline, thinner than the glumes
m. Lemma awned at the tip, the awn usually long
(m) Spikelets in pairs in a spike-like cluster — LYCURUS
(n) Spikelets not in pairs
r. Lemma thin and papery — MUHLENBERGIA
s. Lemma thick and hard
(r) Awns 3-forked — ARISTIDA

(s) Awns simple
h. Awns twisted, persistent — STIPA
i. Awns straight, falling off
(h) Lemma with long silky hairs — ERIOCOMA
(i) Lemma smooth or finely hairy — ORYZOPSIS
n. Lemma usually awnless or awned from the back
(m) Spikelets in a single dense spike
r. Spikelets falling from the axis; awn on the back — ALOPECURUS
s. Spikelets persistent; awn none or short — PHLEUM
(n) Spikelets in a panicle
r. Lemma with a tuft of hairs at base
(r) Lemma thin and papery — CALAMAGROSTIS
(s) Lemma hard and leathery — CALAMOVILFA
s. Lemma without a tuft of hairs
(r) Lemma awned on the back
h. Glumes awned — POLYPOGON
i. Glumes acute
(h) Palet 1-nerved; stamen 1 — CINNA
(i) Palet 2-nerved or none; stamens 3 — AGROSTIS
(s) Lemma not awned
h. Grain permanently enclosed in lemma and palet — AGROSTIS
i. Grain not permanently enclosed
(h) Stamen 1; stigma at tip of glumes — PHIPPSIA
(i) Stamens 2-3; stigma at side of glumes — SPOROBOLUS
(y) Lemma like the glumes, or thicker and firmer

m. Spikelets in 3's in a cylindric spike with zig-zag axis; lemma and palet like the glumes in texture — HILARIA
n. Spikelets in panicles, or in spikes, not in 3's; lemma thicker and harder than the glumes
(m) Spikelets in a spiny bur-like involucre — CENCHRUS
(n) Spikelets not in a bur
r. Spikelets in one-sided racemes or spikes
(r) Spikes 1-2 — PASPALUM
(s) Spikes 3-10 — DIGITARIA
s. Spikelets in a panicle or cylindric spike
(r) Spikelets in a panicle
h. Spikelets solitary, not awned — PANICUM
i. Spikelets in spike-like groups, awned — ECHINOCHLOA
(s) Spikelets in a cylindric spike with an involucre of bristles — CHAETOCHLOA

AGROPŸRUM Gaertner 1770 WHEAT GRASS, QUACK GRASS

(Gr. *agros*, field, *pyron*, wheat, from the habitat of the quack grass)

Pl. 46, fig. 26, 27.

Spikelets 3-many-flowered, in a terminal spike, sessile, and single at each joint of a more or less zig-zag axis, the face of the spikelet turned toward the axis; glumes 2, lanceolate or lance-linear, often awned; lemma rounded on the back, 5-7-nerved, acute or awned, palet 2-keeled, the keels often ciliate; annual or perennial.

1. Stems in bunches, without creeping rootstocks or stolons
a. Awns 2-3 cm. long; stems spreading or prostrate; at 10-13000 ft. — *A. scribneri*
b. Awns less than 2 cm. long; stems erect; at 4-10000 ft.

(1) Spikelets much flattened; awns spreading, 1-2 cm. long — *A. spicátum*
(2) Spikelets cylindric or little flattened, awned or awnless — *A. canínum*

2. Stems not in bunches from creeping rootstocks, usually forming a turf
a. Spikelets much flattened, not densely hairy; awned or awnless — *A. occidentále*
b. Spikelets nearly cylindric, or densely hairy when somewhat flattened
(1) Spikelets cylindric, usually smooth, enclosed by the glumes or nearly so — *A. pseudorépens*
(2) Spikelets somewhat flattened, usually densely hairy; glumes half as long as the spikelets or less — *A. dasystáchyum*

Agróstis Linné 1753 Redtop, Hair Grass

(Gr. *agros*, field, from the habitat)

Pl. 46, fig. 13.

Spikelets 1-flowered in panicles; glumes 2, keeled, acute or awned; lemma obtuse, hyaline, occasionally with an awn on the back, palet shorter, sometimes tiny or wanting; annual or perennial.

1. Axis of spikelet extending beyond the palet; spikelets 2 mm. long — *A. thurberiána*
2. Axis of spikelet not extending beyond the palet
a. Palet distinct, 2-nerved
(1) Lemma shorter than the glumes
(a) Stems 1-3 ft. high; panicles open and spreading; lemma without prickle on the back — *A. álba*
(b) Stems 4-8 in. high; panicle narrow, spike-like; lemma with a tiny prickle on back below the tip — *A. deprássa*
(2) Lemma equalling the glumes; awnless — *A. húmilis*
b. Palet a tiny nerveless scale or none
(1) Panicle narrow, not spreading; spikelets 2-4 mm. long; glumes about equal; lemma ½-¾ as long as the glumes — *A. exaráta*
(2) Panicle open and spreading; spikelets 1-2 mm. long; glumes equal; lemma a little shorter or equalling the glumes — *A. hiemális*

PLATE 46

GRASSES

Clusters and spikelets, the latter x3 except where indicated.

GRAMA GRASS TRIBE

1. Bulbilis dactyloides: Buffalo Grass; 1. staminate branch; a. pistillate branch; b. staminate flower
2. Bouteloua oligostachya: Grama Grass: spikes; spikelets
3. Bouteloua curtipendula; spikes; spikelet x2
4. Spartina cynosuroides: Cord Grass, Slough Grass
5. Beckmannia eruciformis
6. Schedonnardus paniculatus; spikes; spikelets

OAT TRIBE

7. Danthonia sericea: Oat Grass
8. Avena striata: Oat
9. Graphephorum melicoides: cluster; spikelet x2
10. Deschampsia caespitosa: Hair Grass; cluster; spikelet
11. Trisetum subspicatum: False Oat; spike; spikelet

REDTOP TRIBE

12. Calamagrostis purpurascens: Reed Grass
13. Agrostis hiemalis: Hair Grass; cluster; spikelet
14. Sporobolus tricholepis; cluster; spikelet
15. Stipa comata: Spear Grass
16. Stipa viridula
17. Aristida purpurea: Wire Grass
18. Alopecurus geniculatus: Foxtail
19. Oryzopsis micrantha: Mountain Rice
20. Eriocoma cuspidata: Indian Millet
21. Muhlenbergia gracilis
22. Muhlenbergia gracillima
23. Phleum alpinum: Timothy

BARLEY TRIBE

24. Elymus sitanion
25. Hordeum jubatum: Squirreltail Grass
26. Agropyrum caninum: Wheat Grass, Quack Grass; spike; spikelet x1½
27. Agropyrum spicatum: spike; spikelet x1½

CANARY-GRASS TRIBE

28. Hierochloe odorata: Holy Grass
29. Phalaris arundinacea: Canary Grass

PANIC-GRASS TRIBE

30. Panicum capillare: Panic Grass; cluster; spikelet
31. Digitaria sanguinalis: Finger Grass

HILARIA TRIBE

32. Hilaria jamesi: Black Bunch Grass

BLUESTEM TRIBE

33. Chrysopogon nutans: Golden Beard
34. Andropogon scoparius: Bluestem, Bunch Grass
35. Andropogon furcatus: pair of spikelets

Alopecúrus Linné 1753 Foxtail

(Gr. *alopex*, fox, *oura*, tail, from the spike)

Pl. 46, fig. 18.

Spikelets 1-flowered, flattened, in a narrow spike; glumes acute or short-awned, flattened and keeled; lemma obtuse, 3-nerved, awned on the back, palet hyaline, acute or none; annual or perennial.

1. Spikes 1-4 in. long, 4-8 mm. wide — *A. geniculátus*
2. Spikes 1-1.5 in. long, 8-15 mm. wide — *A. alpínus*

Andropógon Linné 1753 Bluestem, Bunch Grass

(Gr. *aner, andros*, man, *pogon*, beard, from the hairy axis)

Pl. 46, fig. 34, 35.

Spikelets in pairs at each joint of the hairy axis of the terminal and axillary spikes, one spikelet sessile and perfect, with 2 glumes, 2 lemmas, the inner awned, and a palet; the other spikelet with a stalk, either staminate, empty, or represented by a single scale; tall perennials.

1. Spikes solitary, 1-2 in. long, distant; stems 2-4 ft. high, usually densely clustered; awn of the glume 10-12 mm. long — *A. scopárius*
2. Spikes 2 or more in a cluster; stems 2-6 ft. high
   a. Spikes 2-5 together in an umbel-like cluster; stems 3-6 ft. high
      (1) Hairs as long as the stalk, or longer; awn 4-10 mm. long or wanting — *A. hálli*
      (2) Hairs less than half the length of the stalk; awn 10-15 mm. long — *A. furcátus*
   b. Spikes several in a short panicle; stems 1-4 ft. high; awn 8-16 mm. long — *A. torreyánus*

Arístida Linné 1753 Aristida, Wire Grass

(Lat. *arista*, awn)

Pl. 46, fig. 17.

Spikelets 1-flowered, in narrow panicles or spikes; glumes keeled; lemma stiff and folded, bearing 3 awns, sometimes united at base, the 2 lateral awns sometimes much reduced or wanting, palet 2-nerved; annual or perennial, often with needle-like leaves.

1. Glumes nearly equal, the upper with an awn 4-8 mm. long — *A. oligántha*

2. Lower glume about ½ as long as the upper
   a. Central awn 1-3.5 in. long — *A. purpúrea*
   b. Central awn 8-15 mm. long — *A. fasciculáta*

AVÉNA Linné 1753 OAT
(Lat. name of the oat)
Pl. 46, fig. 8.

Spikelets 2-several-flowered, in panicles, the upper flower often staminate and imperfect; glumes more or less equal, persistent, often large and enclosing the spikelet; lemma rounded on the back, acute, usually awned on the back, the apex often 2-toothed, palet narrow, 2-toothed; annual or perennial.

1. Glumes 1-2 cm. long, enclosing the spikelet; annual — *A. fátua*
2. Glumes 4-7 mm. long, much shorter than the spikelet; perennial
   a. Lemma 6-8 mm. long; panicle open — *A. striáta*
   b. Lemma 12mm. long; panicle spike-like — *A. mortoniána*

BECKMÁNNIA Host 1805
(Named for Beckmann, a Russian botanist)
Pl. 46, fig. 5.

Spikelets 1-2-flowered, globose, compressed, densely imbricated in 2 rows on one side of a continuous axis, in short 1-sided spikes; glumes sack-like; lemma narrow, papery, palet 2-keeled; perennial with erect spikes in a terminal panicle.

Stems 1.5-3 ft. high; spikes 10-12 mm. long; spikelets 2-3 mm. long — *B. erucifórmis*

BRÓMUS Linné 1753 BROME GRASS, CHESS
(Gr. *bromos*, a kind of oats)
Pl. 45, fig. 18.

Spikelets 5-12-flowered, in terminal panicles; glumes unequal, acute; lemma rounded or keeled, 5-9-nerved, apex usually 2-toothed and with an awn just below the summit, palet shorter, 2-keeled; annual or perennial.

1. Annual weeds
   a. Lemma awned
      (1) Spikelets 5-8-flowered, hanging; lemma 8-12 mm. long, the awn 12-16 mm. long — *B. tectórum*

(2) Spikelets 6-10-flowered, ascending or somewhat drooping; lemma 6-8 mm. long; awn 6-8 mm. long — *B. secalínus*

b. Lemma not awned; spikelets 7-12-flowered, up to 1 in. long — *B. brizifórmis*

2. Perennial, usually native

a. Lower glume 1-nerved; upper glume 3-nerved

(1) Leaves and sheaths smooth or nearly so; spikelets 2-2.5 cm. long, usually awnless — *B. inérmis*

(2) Leaves and sheaths hairy or rough

(a) Panicle erect; lemma 10-12 mm. long, densely hairy, the awn 2-3 mm. long — *B. pumpelliánus*

(b) Panicle drooping

x. Leaves more or less hairy on both sides; lemma 8-12 mm. long, sparsely to densely hairy, the awn 4-8 mm. long — *B. ciliátus*

y. Leaves rough above, smooth beneath; lemma 12-15 mm. long, hairy, awn 3-5 mm. long — *B. richardsóni*

b. Lower glume 3-nerved; upper glume 3-7-nerved

(1) Panicle erect

(a) Leaves and sheaths hairy; spikelets 5-10-flowered; lemma hairy — *B. marginátus*

(b) Leaves and sheaths usually smooth or rough, not hairy; spikelets 7-11-flowered; lemma not hairy — *B. polyánthus*

(2) Panicle drooping; glumes hairy; lemma densely silky — *B. pórteri*

Bouteloúa Lagasca 1805 Grama Grass

(Named for Boutelou, a Spanish botanist)

Pl. 46, fig. 2, 3.

Spikelets 1-2-flowered, 2-rowed on the flat axis of a 1-sided spike; axis of the spikelet extending beyond the base of the flower and bearing 1-3 awns and 1-3 tiny scales; glumes acute, keeled; lemma broader 3-toothed, teeth awned, palet entire or 2-toothed; annual or perennial.

1. Spikes 1-6, erect or spreading, 1-5 cm. long; stems 2-20 in. high

a. Glumes hairy

(1) Leaves hairy, especially on the margins towards the base; axis of spikelet without a tuft of long hairs under the scales and awns; spike with long point at end *B. hirsúta*
(2) Leaves not hairy as a rule; axis with a tuft of hairs under the scales and awns *B. oligostáchya*
b. Glumes smooth
(1) Spikes 3-6; lemma 4-lobed *B. posystáchya*
(2) Spike usually solitary; lemma 3-lobed *B. prostráta*
2. Spikes many, hanging from the axis, 6-15 mm. long; stems 1-4 ft. tall *B. curtipéndula*

BÚLBILIS Rafinesque 1819 BUFFALO GRASS
(Name of doubtful origin)
(Buchloë Engelm.)
Pl. 46, fig. 1.

Spikelets 2-3-flowered, staminate spikelets in 2 rows in 1-sided terminal spikes, pistillate spikelets in spike-like clusters of 2-3, mostly hidden in the sheaths, borne on short stems; glumes unequal, 1-nerved; lemma 3-nerved; glumes of the pistillate spikelets hardened; monoecious or apparently dioecious perennial spreading by stolons.

Stems with staminate flowers 4-12 in. high, with pistillate flowers .5-3 in. high; staminate spikes 2-3 in a group *B. dactyloídes*

CALAMAGRÓSTIS Adanson 1763 REED GRASS
(Gr. *kalamos*, reed, *agrostis*, grass)
Pl. 46, fig. 12.

Spikelets 1-flowered, in panicles, the axis usually extending beyond the flower and hairy; glumes keeled; lemma obtuse, usually long-hairy at base and with an awn on the back, palet shorter, 2-nerved; perennial.

1. Panicle open, the lower branches long and spreading
a. Lemma 2-toothed, about the length of the awn *C. canadénsis*
b. Lemma 4-toothed *C. scríbneri*
2. Panicle dense and spike-like, the branches short, ascending or erect
a. Leaves more or less inrolled, at least above
(1) Leaves erect, stiff and sharp-tipped
(a) Leaves smooth; spikelets 3-4 mm. long *C. suksdórfi*
(b) Leaves very rough; spikelets 5-6 mm. long *C. purpuráscens*

(2) Leaves loose and almost thread-like; spikelets 4 mm. long *C. neglécta*

b. Leaves flat

(1) Leaf-sheaths smooth; lemma equalled by the hairs *C. hyperbórea*

(2) Leaf-sheaths rough; lemma longer than the hairs *C. scopulórum*

CALAMOVÍLFA Hackel 1890 REED GRASS
(Gr. *kalamos,* reed; Vilfa)

Spikelets 1-flowered, in a panicle, the axis not extending beyond the flower; glumes strongly unequal; lemma with a ring of hairs at the base, palet 2-keeled; perennial.

Stems 2-6 ft. high; spikelet 6-8 mm. long; lemma twice as long as the hairs *C. longifólia*

CATABRÓSA Beauvois 1812 WHORL GRASS
(Gr. *katabrosus,* eaten, from the fringed glumes)
Pl. 45, fig. 24.

Spikelets usually 2-flowered, in a panicle with whorled branches; glumes much shorter than the lemma, unequal, obtuse; lemma fringed or toothed, slightly longer than the palet; aquatic or swamp perennial.

Stems .5-2 ft. high; spikelets 2-3 mm. long; flowering scales 3-nerved *C. aquática*

CÉNCHRUS Linné 1753 SANDBUR
(Ancient Greek name of the millet)

Spikelets enclosed in spiny involucres, the latter in spikes; glumes 2 with a sterile lemma, the lemma and palet enclosing a perfect flower; annual.

Stems .5-2.5 ft. high; spikes 1-3 in. long; involucres globose, spiny, 2-flowered *C. tribuloídes*

CHAETÓCHLOA Scribner 1897 FOXTAIL
(Gr. *chaite,* awn, *chloe,* grass)
(Setaria Beauv.)

Spikelets 1-flowered or rarely with a second staminate flower, in dense spike-like panicles, with bristles at the base; glumes 2 with a sterile lemma; true lemma and palet enclosing a perfect flower; annual or perennial.

1. Bristles at the base of each spikelet 1-4

a. Annual; spikes dense, not interrupted, 3-10 cm. long *C. víridis*

b. Perennial; panicle more or less interrupted, 5-16 cm. long — *C. compósita*

2. Bristles at the base of each spikelet 5-16 — *C. glaúca*

CHRYSOPÓGON Trinius 1820 GOLDEN BEARD.

(Gr. *chrysos*, golden, *pogon*, beard, from the golden-yellow hairs)

Pl. 46, fig. 33.

Spikelets in pairs or 3's, in terminal panicles, 1 spikelet sessile and perfect, with 2 hardened glumes, a sterile papery lemma and a lemma and palet enclosing a perfect flower, palet sometimes wanting; the lateral spikelet stalked, staminate empty or reduced to plumy stalks alone; perennial.

Stems 3-8 ft. high; panicle golden, 4-12 in. long; awn 1-2 cm. long — *C. nútans*

CÍNNA Linné 1753 INDIAN REED

(Origin and meaning uncertain)

Spikelets 1-flowered in nodding panicles; glumes 2, keeled, acute, lemma keeled, often short-awned on the back, palet shorter, 1-nerved, stamen 1; perennial.

1. Branches of the narrow panicle erect — *C. arundinácea*

2. Branches of the loose panicle drooping — *C. latifólia*

DÁCTYLIS Linné 1753 ORCHARD GRASS

(Gr. *daktylos*, finger, of little application)

Spikelets 3-5-flowered, in spike-like panicled clusters; glumes thin, unequal, keeled, tipped; lemma larger than the glumes, 5-nerved, keeled, the mid-nerve extended into a short awn, palet shorter, 2-keeled; perennial.

Stems 2-4 ft. high; panicle 3-8 in. long; lemma 4-6 mm. long — *D. glomeráta*

DANTHÓNIA DeCandolle 1805 OAT GRASS

(Named for Danthoine, a French botanist)

Pl. 46, fig. 7.

Spikelets 3-several-flowered, in closed or open panicles, the axis extending beyond the flower; glumes 2, keeled, acute, nearly equal, usually enclosing the spikelet; lemma rounded, 2-toothed, the awn arising from between the awned teeth, awn bent, flat and twisted, palet 2-keeled, obtuse or 2-toothed; perennial.

1. Spikelets in a spike-like cluster with short, erect branches

a. Empty glumes 15-20 mm. long — *D. sericea*

b. Empty glumes 8-10 mm. long — *D. spicáta*

2. Spikelets in an open raceme or panicle, on spreading and somewhat drooping stalks *D. californica*

Deschámpsia Beauvois 1812 Hair Grass

(Named for Deslongschamps, a French botanist)

Pl. 46, fig. 10.

Spikelets 2-flowered, in close or open panicles, the hairy axis extended beyond the flower; glumes 2, keeled, acute, sometimes enclosing the spikelet; lemma toothed, with an awn on the back, palet narrow, 2-nerved; perennial.

1. Glumes longer than and enclosing the spikelet; panicle narrow, 1-2 in. long *D. atropurpúrea*
2. Glumes shorter than the spikelet and not enclosing it *D. caespitósa*

Digitária Scopoli 1772 Finger Grass

(Syntherisma Walter)

(Lat. *digitus,* finger, from the grouping of the spikes)

Pl. 46, fig. 31.

Spikelets 1-flowered, in pairs or in 3's on 1-sided spikes which are digitate and terminal; spikes often purplish; glumes 2, sterile lemma 2 or 1; lemma and palet enclosing a perfect flower; annual.

1. Spikelets 2-3 mm. long; lower glume tiny, usually present; upper glume about 1 mm. long *D. sanguinális*
2. Spikelets about 2 mm. long; lower glume usually wanting; upper glume about 2 mm. long *D. lineáris*

Diplachne Beauvois 1812

(Gr. *diploos,* double, *achne,* bristle)

Spikelets 5-10-flowered, in an open panicle; glumes unequal, acute, keeled; lemma 2-toothed and short-awned between the teeth, 1-3-nerved, palet 2-nerved; perennial.

Stems 1-3 ft. high; panicle 4-12 in. long; spikelet 6-10 mm. long *D. fasciculáris*

Distíchlis Rafinesque 1819 Salt Grass

(Gr. *di,* two, *stichos.* rank, row)

Pl. 45, fig. 23.

Spikelets 6-16-flowered, in a spike-like panicle, dioecious, flattened; glumes narrow, acute, keeled; lemma broader than the glumes, acute, palet 2-keeled; perennial.

Stems .5-2 ft. high; panicle 1-3 in. long; spikelets 8-20 mm. long *D. spicáta*

EATÓNIA Rafinesque 1819 EATONIA
(Named for Eaton, an American botanist)
Pl. 45, fig. 30.

Spikelets 2-3-flowered, in narrow panicles, the axis extended beyond the flower; glumes unequal, the lower linear, acute, 1-nerved, the upper much broader, obtuse or rounded, 3-nerved, the edges papery; lemma lanceolate, usually obtuse, palet narrow, 2-nerved; perennial.

1. Panicle dense and spike-like, the branches 1-1.5 in. long; upper glume obovate, almost truncate *E. obtusáta*
2. Panicle loose, the branches 1-2.5 in. long, upper glume oblanceolate, obtuse to acutish *E. pennsilvánica*

ECHINÓCHLOA Beauvois 1812 BARNYARD GRASS
(Gr. *echinos,* hedge-hog, *chloe,* grass, from the spiny spikelets)

Spikelets 1-flowered, in 1-sided racemes which are again grouped in racemes or panicles; glumes 2, the upper awned or awn-pointed, a sterile awned lemma, the lemma and palet enclosing the perfect flower; broad-leaved annual.

Stems 1-4 ft. high; panicle of 5-15 branches; sterile lemma with a long or short awn *E. crus-gálli*

ÉLYMUS Linné 1753 WILD RYE
(Gr. *elymos,* rolled up, from the inrolled palet)
Pl. 46, fig. 24.

Spikelets 1-6-flowered, usually in pairs in a dense terminal spike, alternating on the joints of the axis, the glumes forming a sort of involucre for the cluster; glumes awl-shaped, acute or awned; lemma rounded, 5-nerved, usually awned, palet 2-keeled; perennial.

1. Awns spreading widely; joints of the axis separating from each other readily at maturity *E. sitánion*
2. Awns erect or ascending, or none; joints of the axis not separating readily at maturity
   a. Lemma conspicuously awned
      (1) Spikelets spreading from the axis of the broad spike; glumes with awns 16-32 mm. long; awn of the lemma 2-5 cm. long *E. canadénsis*
      (2) Spikelets appressed to the axis of the narrow spike; glumes 8-12 mm. long, short-awned or awn-pointed; awn of the lemma 1-2 cm. long, or less *E. sibíricus*

b. Lemma awn-pointed or merely acute
(1) Stems 3-10 ft. tall; spikes 4-15 in. long, thick — *E. condensátus*
(2) Stems 2-4 ft. high; spikes 2-4 in. long
(a) Spike densely hairy; spikelets 2 at each joint — *E. innovátus*
(b) Spike not hairy; spikelets usually 1 at some or all of the joints — *E. triticoídes*

ERAGRÓSTIS Beauvois 1812 ERAGROSTIS
(Gr. *er*, spring, *agrostis*, grass)
Pl. 45, fig. 26.

Spikelets 2-35-flowered, flattened, in panicles; glumes more or less equal, keeled, 1 or 3-nerved; lemma longer than glumes, keeled, 3-nerved, palet shorter, 2-nerved or 2-keeled, usually persisting after the lemma falls; annual or perennial.

1. Spikelets 8-35-flowered, 5-16 mm. long, 3-4 mm. wide; lemma 3-4 mm. long — *E. major*
2. Spikelets 5-15-flowered, 3-8 mm. long, 1-2 mm. wide; lemma less than 2 mm. long
a. Stems 5-15 in. high; panicles 3-8 in. long, usually greenish — *E. púrshi*
b. Stems 1-3 ft. high; panicle 6-24 in. long, purple — *E. pectinácea*

ERIOCÓMA Nuttall 1818 INDIAN MILLET
(Gr. *erion*, wool, *kome*, hair)
Pl. 46, fig. 20.

Spikelets 1-flowered, in panicles; glumes broad, awn-tipped; lemma firm, oval to elliptic, densely silky-hairy and with a terminal awn; perennial.

Stems 1-3 ft. high; panicle 6-12 in. long; spikelet 6-8 mm. long — *E. cuspidáta*

FESTÚCA Linné 1753 FESCUE
(The ancient Latin name)
Pl. 45, fig. 19.

Spikelets 2-13-flowered, in racemes or panicles; glumes more or less unequal, acute, keeled; lemma narrow, rounded on the back, 5-nerved, usually awned at the tip, palet little shorter; annual or perennial.

1. Spikelets 6-13-flowered; stamens 2; annual — *F. octoflóra*
2. Spikelets 2-10-flowered; stamens 3; perennial
a. Leaves inrolled, 1-2 mm. wide

(1) Stems densely tufted, without rootstocks or stolons
(a) Stems 1-8 in. high; spikelets 2-4-flowered; lemma not twice as long as the lower glume, with an awn 1-2.5 mm. long *F. brachyphýlla*
(b) Stems 8 in.-2.5 ft. high; lemma more than twice as long as the lower glume, with an awn 1-4 mm. long *F. ovína*
(2) Stems with root-stalks or stolons *F. rúbra*
b. Leaves flat, 2-5 mm. wide
(1) Awn longer than the lemma
(2) Stems with rootstocks or stolons *F. jónesi*
(a) Spikelets 5-9-flowered; upper glume 3-5-nerved *F. elátior*
(b) Spikelets 3-5-flowered; upper glume 1-nerved or 3-nerved at base
x. Panicle open, spreading; leaves 2 mm. wide *F. scabrélla*
y. Panicle spike-like; leaves 2-4 mm. wide *F. confínis*

GRAPHÉPHORUM Desvaux 1810

(Gr. *graphe*, pencil, *phora*, bearing, from the tuft of hairs on the axis)

Pl. 46, fig. 9.

Spikelets 2-4-flowered, flattened, in a panicle, the axis hairy and extending beyond the flower; glumes acute, keeled; lemma longer than the glumes, 3-5-nerved, entire, sometimes with a short awn below the apex, palet narrow; perennial.

Stems 1-2.5 ft. high; panicle 2-6 in. long; spikelets 5-6 mm. long *G. melicoídes*

HIEROCHLÓE Beauvois 1812 HOLY GRASS

(Gr. *hieros*, sacred, *chloe*, grass, from its use on saints' days)

Pl. 46, fig. 28.

Spikelets 3-flowered, in panicles, terminal flower perfect, the others staminate; glumes nearly equal, acute; sterile lemma and lemma somewhat shorter, obtuse, entire or 2-toothed, sometimes awned, palet hairy at the tip; sweet-scented perennial.

Stems 1-2 ft. high; panicle 2-4 in. long; spikelets 4-6 mm. long *H. odoráta*

HILÁRIA H. B. K. 1815 BLACK BUNCH GRASS
(Named for St. Hilaire, a French botanist)
Pl. 46, fig. 32.

Spikelets in groups of 3 at each joint of the zig-zag axis of the spikes, the outer spikelets 2-3-flowered and staminate, inner spikelet 1-flowered, pistillate; glumes unequal, 5-nerved, usually 2-lobed, the lower glume awned; lemmas much narrower than the glumes; perennials with terminal, solitary spikes.

Stems 1-2 ft. high; spikes 2-4 in. long; spikelets 8-10 mm. long; awn of the lower glume longer than the spikelet — *H. jámesi*

HOMALOCÉNCHRUS Meigen 1776 RICE CUT GRASS
(Gr. *homalos,* like, *kenchros,* millet)

Spikelets 1-flowered, in panicles, strongly flattened; glumes 2, the lower broad and folded, the inner much narrower; lemma and palet lacking; marsh perennial.

Stems 1-4 ft. high; panicle 5-9 in. long; spikelets 4-5 mm. long — *H. oryzoides*

HÓRDEUM Linné 1753 BARLEY, SQUIRRELTAIL GRASS
(The Latin name of the barley)
Pl. 46, fig. 25.

Spikelets 1-flowered, usually 3 at each joint of the axis of the terminal, cylindric spike, lateral spikelets usually short-stalked and imperfect, the axis produced beyond the flower; glumes usually awn-like and appearing like the involucre around the spikelet; lemma rounded on the back, 5-nerved, awned, palet nearly equal, 2-keeled; annual or perennial.

1. Spikes feathery with spreading awns; awn of the central lemma 1-3 in. long — *H. jubátum*
2. Spikes narrow, the awns short and erect
   a. Glumes needle-like, all alike
      (1) Lateral spikelets neutral — *H. nodósum*
      (2) Lateral spikelets with flowers — *H. boreále*
   b. Glumes of 2 sorts, those of the middle spikelet broad at base, lanceolate — *H. pusíllum*

KOELÉRIA Persoon 1805 KOELERIA
(Named for Koeler, a German botanist)
Pl. 45, fig. 28.

Spikelets 2-5-flowered, in a spike-like panicle; glumes unequal, narrow, acute, keeled; lemma 3-5-nerved, palet 2-keeled; perennial.

Stems 1-3 ft. high; panicle 1-7 in. long; spikelets 4-6 mm. long, the keel rough-ciliate — *K. cristáta*

Lycúrus H. B. K. 1815 Texan Timothy

(Gr. *lykos*, wolf, *oura*, tail)

Spikelets 1-flowered, usually in pairs in spike-like terminal panicles; glumes 2, 3-nerved, the nerves often extending into awns; lemma broader and longer than the glumes, 2-nerved, palet smaller, 2-nerved, 2-toothed; tufted perennial.

Stems 8-20 in. high; panicles 1-3 in. long; spikelets 4 mm. long, the lemma with an awn its own length — *L. phleoides*

Lólium Linné 1753 Darnel

(The Latin name)

Spikelets 4-10-flowered, solitary, sessile, and alternate in the notches of the terminal spike, flattened, the edge of the spikelet turned toward the axis; glumes 1 or 2; lemmas rounded on the back, 5-7-nerved, palet 2-keeled; annual or perennial.

1. Glume shorter than the spikelet — *L. perénne*
2. Glume equalling or exceeding the spikelet — *L. temuléntum*

Mélica Linné 1753 Melic Grass

(A Greek name of the sorghum, probably from *mel*, honey)

Pl. 45, fig. 22.

Spikelets 2-5-flowered, in panicles, the axis extended beyond the flowers and usually bearing 2-3 empty scales; glumes more or less unequal, 3-5-nerved; lemma rounded on the back, 7-13-nerved, sometimes awned, palet shorter than the lemma, 2-keeled; perennial.

1. Stems bulbous-thickened at the base; spikelets 5-8-flowered, 10-12 mm. long — *M. bulbósa*
2. Stems not bulbous-thickened at the base; spikelets 2-5-flowered
   a. Spikelets nodding — *M. parviflóra*
   b. Spikelets not nodding — *M. smíthi*

Muhlenbérgia Schreber 1789 Muhlenbergia

(Named for Muhlenberg, an American botanist)

Pl. 46, fig. 21, 22.

Spikelets 1-flowered, in open or dense, spike-like panicles, glumes acute, sometimes awned; lemma 3-5-nerved, obtuse, acute or awned, palet narrow; annual or perennial.

1. Panicle narrow or spike-like, the short branches erect or ascending
   a. Lemma with an awn usually 1-2 cm. long
      (1) Panicle dense; lemma with a tuft of basal hairs its own length — *M. comáta*
      (2) Panicle narrow, not dense and spike-like; lemma without a tuft of basal hairs — *M. grácilis*
   b. Lemma with an awn 1-2 mm. long, or awnless
      (1) Stems with scaly rootstocks
         (a) Glumes about equal, much longer than the lemma — *M. racemósa*
         (b) Glumes somewhat unequal, the longer equalling the lemma — *M. mexicána*
      (2) Stems without scaly rootstocks
         (a) Panicles 1-2 in. long, upper glume 3-nerved — *M. filicúlmis*
         (b) Panicles 2-4 in. long; upper glume 1-nerved — *M. wrighti*
2. Panicle open, the branches spreading, often horizontal
   a. Lateral branches of the panicle panicle-like; spikelets 3 mm. long; awn 1-2 mm. long — *M. púngens*
   b. Lateral branches of the panicle raceme-like; spikelets 2 mm. long; awn 2-6 mm. long — *M. gracíllima*

Munróa Torrey 1856 Munroa

(Named for Munroe, an English botanist)

Pl. 45, fig. 25.

Spikelets 2-5-flowered, in clusters of 3-6 in the axils of the floral leaves; glumes lanceolate, acute, 1-nerved; lemma larger, 3-nerved, 3-toothed at apex with tufts of hairs near the middle, palet narrow, acute; low grass with short spiny-tipped leaves.

Stems tufted, 2-8 in. high; leaves an inch long or less, spiny-tipped — *M. squarrósa*

Oryzópsis Michaux 1803 Mountain Rice

(Gr. *oryza*, rice, *opsis*, likeness)

Pl. 46, fig. 19.

Spikelets 1-flowered, in panicles; glumes 2, equal or unequal; lemma broad with a terminal awn, palet narrow; perennial.

1. Spikelet, exclusive of awn, 2-5 mm. long
   a. Awn 1-2 mm. long, much shorter than the lemma; spikelets 3-4 mm. long — *O. júncea*
   b. Awn 4 mm. long; spikelets 4-5 mm. long — *O. exígua*
   c. Awn 6-8 mm. long, more than twice as long as the lemma; spikelets 2-2.5 mm. long — *O. micrántha*
2. Spikelets, exclusive of awn, 6-8 mm. long — *O. asperifólia*

PANICULÁRIA Fabricius 1763 MANNA GRASS
(Lat. *panicula*, panicle)
(Glyceria Robert Brown)
Pl. 45, fig. 20.

Spikelets 3-13-flowered, in panicles; glumes acute or obtuse, 1-3-nerved; lemma rounded on the back, 5-9-nerved, palet scarcely shorter, 2-keeled; perennial swamp or water grasses.

1. Spikelets ovate to oblong, 2-6 mm. long
   a. Panicle 3-8 in. long, nodding, at least above
      (1) Spikelets 2-4 mm. long; lemma 7-nerved — *P. nervàta*
      (2) Spikelets 4-5 mm. long; lemma 5-nerved — *P. pauciflóra*
   b. Panicle 8-15 in. long, erect or nodding — *P. grándis*
2. Spikelets linear, 1-2 cm. long — *P. flúitans*

PÁNICUM Linné 1753 PANIC GRASS
(The Latin name)
Pl. 46, fig. 30.

Spikelets 1-2-flowered in panicles, when 2-flowered the lower one staminate; glumes 2, sterile lemma sometimes with a staminate flower; lemma and palet enclosing the perfect flower; awns none; annual or perennial.

1. Spikelets pointed, lanceolate or lance-ovate
   a. Stems 1-2 ft. high; sheaths bristly-hairy; spikelets 2-3 mm. long — *P. capilláre*
   b. Stems 3-5 ft. high; sheaths not hairy; spikelets 4-5 mm. long — *P. virgátum*
2. Spikelets not pointed, obtuse or rounded, ovoid to obovoid, 2-3 mm. long — *P. scopárium*

PÁSPALUM Linné 1759 PASPALUM
(The Greek name of a grass)

Spikelets 1-flowered, oblong to round, plano-convex, in 2-4 rows on 1-sided spikes, the latter single, paired or panicled; glumes 2; lemma and palet with a perfect flower; perennial.

Stems 1-2 ft. high; spikes 1.5-4 in. long, mostly single; spikelets 1.5-2 mm. long — *P. setáceum*

PHÁLARIS Linné 1753 CANARY GRASS
(Gr. *phalos*, shining, from the grain)
Pl. 46, fig. 29.

Spikelets 1-flowered, in spikes or spike-like panicles; glumes 2; sterile lemmas 2, tiny or reduced to silky awns; lemma pointed, hairy, palet similar; annual or perennial.

1. Spikelets in a spike-like panicle; glumes not winged — *P. arundinácea*
2. Spikelets in an ovoid to cylindric spike; glumes broadly winged
   a. Spike ovoid to oblong, .5-1.5 in. long; spikelet 6-8 mm. long; sterile lemmas small scales — *P. canariénsis*
   b. Spike cylindric, 1-4 in. long; spikelets 5 mm. long; sterile lemmas hairy-awned — *P. caroliniána*

PHÍPPSIA Trinius 1821
(Named for Phipps, an Arctic explorer)

Spikelets 1-flowered, in small panicles; glumes tiny, the lower often wanting; lemma keeled, palet somewhat shorter, fringed-toothed, 2-keeled, stamen usually 1; tufted alpine perennial.

Stems 1-4 in. high; panicles .5-3.5 cm. long; spikelets 1-1.5 mm. long — *P. álgida*

PHLÉUM Linné 1753 TIMOTHY
(The Greek name of a plant)
Pl. 46, fig. 23.

Spikelets 1-flowered, in spikes; glumes 2, flattened, keeled, mid-nerve produced into an awn; lemma much shorter, broad, toothed at tip, palet narrow; annual or perennial.

1. Spike cylindric, 1.5-8 in. long, 5-8 mm. wide; stems 2-5 ft. tall — *P. praténse*
2. Spike ovoid to oblong, .5-2 in. long, 6-12 mm. wide; stems .5-1.5 ft. high — *P. alpínum*

PHRAGMÍTES Trinius 1820 REED GRASS
(Gr. *phragma*, hedge, from its dense growth)

Spikelets 3-several-flowered, in panicles, first flower often staminate, axis jointed between the lemmas, long-hairy; glumes unequal, lanceolate, acute, shorter than the spikelet; sterile lemma sometimes with a staminate

flower; lemma narrow, long-pointed, much exceeding the palet; reed-like swamp perennial.

Stems 5-15 ft. high; panicle .5-1.5 ft. long; flowering scales 10-12 mm. long — *P. commúnis*

Póa Linné 1753 Blue Grass

(Gr. *poa*, grass)

Pl. 45, fig. 21.

Spikelets 2-6-flowered, in panicles, flattened, flowers mostly perfect; glumes keeled, 1-3-nerved; lemma longer than the glumes, often cobwebby-hairy at base, 5-nerved, the nerves usually hairy; palets usually shorter, 2-nerved or 2-keeled; annual or perennial.

1. Stems annual, i. e., without rootstocks, tufted, 2-8 in. high; lemma 5-nerved, not cobwebby at base — *P. ánnua*
2. Stems perennial, with rootstocks
   - a. Stems distinctly flattened and 2-edged — *P. compréssa*
   - b. Stems round, not 2-edged
     - (1) Lemma cobwebby at base
       - (a) Panicle small, 2-4 cm. long — *P. láxa*
       - (b) Panicle large, 5-15 cm. long
         - x. Branches of the panicle reflexed — *P. refléxa*
         - y. Branches not reflexed
           - (x) Lemmas acute or pointed — *P. praténsis*
           - (y) Lemmas obtuse — *P. fláva*
     - (2) Lemma not cobwebby
       - (a) Panicle 2-4 cm. long; leaves 2-4 cm. long, 3-4 mm. wide — *P. alpína*
       - (b) Panicle 4-15 cm. long; leaves 5-20 cm. long, 1-3 mm. wide
         - x. Stems 1-8 in. high; at 11-14500 ft.
           - (x) Stems 1-4 in. high; lemma smooth or nearly so — *P. lettermánni*
           - (y) Stems 4-8 in. high; lemma very hairy, especially the nerves — *P. pattersóni* . .
         - y. Stems 1-4 ft. high, at 4-11000 ft.
           - (x) Spikelets distinctly flattened
             - m. Flowers perfect
               - (m) Plants tufted, without rootstocks; panicle narrow, dense, green to purple; glumes more or less unequal — *P. subaristáta*

(n) Plants not tufted, with creeping rootstocks; panicles open; leaf-sheaths hairy to smooth — *P. wheéleri*

n. Flowers dioecious — *P. fendleriána*

(y) Spikelets nearly round, little flattened

m. Lemmas hairy, at least at base — *P. lúcida*

n. Lemmas not hairy, finely roughened — *P. nevadénsis*

Polypógon Desfontaines 1800 Beard Grass
(Gr. *polys,* many, *pogon,* beard)

Spikelets 1-flowered in spike-like panicles; glumes awned, lemma smaller, short-awned below the tip, palet shorter; annual.

Stems tufted, 4-20 in. high; panicle 1-4 in. long; glumes 2 mm. long, with a bent awn, 4-6 mm. long — *P. monspeliénsis*

Puccinéllia Parlatore 1848 Meadow Grass
(Named for Puccinelli, an Italian botanist)

Spikelets usually 3-10-flowered, in panicles; glumes unequal, obtuse or acute; lemma rounded on the back, obtuse or acute, 5-nerved, the nerves faint, palet about equal; perennial.

Stems 1-4 ft. high; spikelets 3-6 mm. long; lemma 2 mm. long — *P. airoídes*

Redfiéldia Vasey 1887 Redfieldia
(Named for Redfield, an American botanist)
Pl. 45, fig. 29.

Spikelets 1-3-flowered, in panicles; glumes 2, equal, 1-nerved, shorter than the spikelet; lemma 3-nerved with a tuft of hairs at base, palet shorter, 2-nerved; perennial.

Stems 1-4 ft. high; leaves 1-2 ft. long; panicle 8-20 in. long; spikelets 6 mm. long — *R. flexuósa*

Schedonnárdus Steudel 1855 Schedonnardus
(Gr. *schedon,* near; Nardus)
Pl. 46, fig. 6.

Spikelets 1-flowered, sessile and alternate on a zig-zag axis, in slender spikes forming raceme-like clusters; glumes 2, narrow, awn-pointed; lemma longer, palet narrow, shorter; annual.

Stems .5-1.5 ft. high; spikes 2-4 in. long; spikelets 2-3 mm. long *S. paniculátus*

SCLEROPÓGON Philippi 1860
(Gr. *skleros,* stiff, *pogon,* beard)

Spikelets dissimilar, dioecious, in a narrow panicle, staminate spikelets flattened, linear, 10-14-flowered, with lanceolate, acute glumes and a 3-toothed lemma equalled by the palet; pistillate spikelets linear-oblong, 3-5-flowered; glumes lanceolate, the upper larger; lemma cylindric, enclosing the palet; joints of the axis, 5-nerved, the 3 main nerves ending in 3 long twisted awns.

Stems tufted, 4-12 in. high; staminate spikelets 1-3 cm. long, pistillate 1-2 cm. long *S. karwinskiánus*

SÓRGHUM Persoon 1805 JOHNSON GRASS
(The Indian name)

Spikelets in pairs at the joints, or in 3's at the ends of the branches of terminal panicles; one spikelet, sessile and perfect, the lateral stalked, staminate or empty; glumes 2, the outer hard and shiny; sterile lemma present; lemma awned, enclosing a small palet and perfect flower, or the palet sometimes lacking; annual or perennial.

Stems 3-5 ft. high; panicle .5-1.5 ft. long; sessile spikelet 4-6 mm. long, the awn 8-15 mm. long *S. halepénse*

SPARTÍNA Schreber 1789 CORD GRASS, SLOUGH GRASS
(Gr. *spartinos,* cord-like, from the leaves of some species)
Pl. 46, fig. 4.

Spikelets 1-flowered, jointed with a pedicel below the glumes, in 2 rows on the axis of 1-sided spikes, the latter in raceme-like clusters; glumes 2, unequal, keeled; lemma keeled, palet often longer, 2-nerved; marsh perennial.

1. Lower glume equalling the lemma, upper glume awned; stems 3-6 ft. high; spikes 5-20, 2-5 in. long *S. cynosuroides*
2. Lower glume, acute, shorter than the lemma, upper glume not awned; stems 1-3 ft. high; spikes 4-8, 1-2 in. long *S. grácilis*

SPORÓBOLUS Robert Brown 1810 RUSH GRASS
(Gr. *spora,* seed, *bolos,* thrown, from the deciduous grain)
Pl. 46, fig. 14.

Spikelets 1-flowered, in panicles; glumes 2, equal or unequal; lemma

equalling or longer than the glumes, smooth or long-hairy, palet 2-nerved; perennial or annual.

1. Panicle narrow and spike-like
   a. Plants 1-2 in. high; spikelets 1 mm. long — *S. wólfi*
   b. Plants 4-20 in. high
      (1) Spikelets 3-5 mm. long — *S. vaginiflórus*
      (2) Spikelets 1.5-3 mm. long
         (a) Spikelets 1.5-2 mm. long; panicles 1-2 cm. long — *S. símplex*
         (b) Spikelets 2.5-3 mm. long; panicles 1-7 cm. long — *S. brevifólius*
2. Panicle open, at least after flowering
   a. Lemma densely silky-hairy on the nerves; spikelets 2.5-3 mm. long — *S. trichólepis*
   b. Lemma not densely silky-hairy
      (1) Glumes about equal
         (a) Annual; leaves 1-1.5 mm. wide — *S. confúsus*
         (b) Perennial; leaves 2-3 mm. wide — *S. asperifólius*
      (2) Lower glume half the length of the upper
         (a) Spikelets 4-6 mm. long — *S. heterólepis*
         (b) Spikelets 1.5-2.5 mm. long
            x. Panicle 1.5-3 in. long; lower glume about ¼ the length of the upper — *S. argútus*
            y. Panicle 5-15 in. long
               (x) Panicle more or less included in the leaf-sheath; spikelets 2-2.5 mm. long; lower glume ⅓ the length of the upper — *S. cryptándrus*
               (y) Panicle usually exserted; spikelets 1.5-2 mm. long; lower glume about ½ as long as the upper — *S. airoides*

Stípa Linné 1753 Stipa, Spear Grass

(Gr. *stypa*, tow, probably from the use of some species)

Pl. 46, fig. 15, 16.

Spikelets 1-flowered, long and narrow, in open or dense panicles; glumes narrow, acute or awn-pointed; lemma stiff, inrolled, with a hairy hard point at base, bearing a usually bent awn which is spiral at base, palet 2-nerved, included; tall perennial or annual.

1. Awn 1-5 cm. long
   a. Panicles open

(1) Awn long-plumy; glumes equal, 5 mm. long — *S. mongólica*
(2) Awn rough, not plumy; glumes unequal, the lower 9 mm. long — *S. richardsóni*

b. Panicles narrow and spike-like
(1) Awn long-plumy, the hairs 1-6 mm. long
(a) Glumes 10-12 mm. long; lemma sparsely hairy, 5-6 mm. long — *S. occidentális*
(b) Glumes 16-18 mm. long; lemma silky, 10-12 mm. long — *S. speciósa*
(2) Awn not plumy, or at least the hairs less than 1 mm. long
(a) Lemma with a tuft of hairs at the tip — *S. Scribneri*
(b) Lemma without a tuft of hairs at the tip; stems 3-8 ft. high; sheaths smooth or hairy; awns 2-4 cm. long — *S. viridula*

2. Awn 3-7 in. long
a. Awn plumy; glumes 3-4 cm. long — *S. neo-mexicána*
b. Awn not plumy, glumes 2-3.5 cm. long
(1) Panicle usually partly included in the sheath; glumes 18-27 mm. long; lemma 8-12 mm. long — *S. comáta*
(2) Panicle not enclosed at base; glumes 24-36 mm. long; lemma 14-25 mm. long — *S. spártea*

Tríódia Robert Brown 1810 Triodia

(Gr. *tri-*, from the 3-pointed lemmas)
(Tricuspis, Triplasis Beauvois)
Pl. 45, fig. 27.

Spikelets 2-12-flowered, in racemes or panicles; glumes keeled, 1-3-nerved; lemma 3-nerved, lobed or toothed at tip, the nerves hairy and usually extending as short points between the teeth, palet broad, 2-keeled; perennial.

1. Spikelets loosely 2-5-flowered, 5-8 mm. long; lemma 2-lobed at tip, the middle nerve becoming a short awn — *T. purpúrea*
2. Spikelets 5-12-flowered
a. Lemma awnless, entire or 2-toothed — *T. mútica*
b. Lemma awned
(1) Spikelets 6-7-flowered — *T. pulchélla*
(2) Spikelets 8-12-flowered — *T. acumináta*

TRISÉTUM Persoon 1805 FALSE OAT
(Lat. *tri-*, three, *seta*, bristle)
Pl. 46, fig. 11.

Spikelets 2-4-flowered, in spike-like or open panicles; glumes 2, unequal, acute; lemma usually shorter than the glumes, 2-toothed, with an awn on the back, palet narrow, 2-toothed; perennial.

1. Panicles dense and spike-like, 1-4 in. long; leaves 1-4 in. long; lower glume 3-nerved — *T. subspicátum*
2. Panicles loose but not spreading; leaves 5-10 in. long; lower glume 1-nerved — *T. montánum*

PINALES PINE ORDER

PINACEAE PINE FAMILY

Sepals and petals none, stamens scale-like, forming cones several-many in a cluster, pistils scale-like, bearing the ovules exposed on the surface, forming few-many-scaled cones, or berries, fruit a cone with few-many woody, papery or fleshy scales, sometimes a berry; flowers or cones usually monoecious; trees or shrubs usually with scale-like or needle-like, evergreen leaves.

1. Leaves alternate or in clusters
   a. Leaves alternate, scattered; cones fringed or with papery scales
      (1) Leaves square or 4-angled, inserted on raised bases; cones hanging, not fringed — PICEA
      (2) Leaves flat
         (a) Cones hanging, fringed with 3-lobed scales — PSEUDOTSUGA
         (b) Cones erect in the top of the tree, not fringed — ABIES
   b. Leaves in clusters or fascicles; cones with thick, woody scales — PINUS
2. Leaves opposite or in whorls of 3; cones berry-like — JUNIPERUS

ÁBIES Jussieu 1789 FIR
(The Latin name)
Pl. 47, fig. 8, 9.

Staminate cones axillary, pistillate cones lateral, erect on the topmost branches of the trees, ovules 2 on each scale, the latter with a thin papery,

pointed bract; fruiting cones oblong to cylindric, the scales falling away from the spine-like axis; leaves flat, linear, scattered, single, spreading and appearing 2-ranked; evergreen trees.

1. Cones 7-12 cm. long, 3-5 cm. wide; leaves 3.5-6 cm. long, widely spreading — *A. cóncolor*
2. Cones 5-7 cm. long, 2-3 cm. wide; leaves 2-3.5 cm. long, usually somewhat crowded — *A. lasiocárpa*

Juníperus Linné 1753 Juniper, Cedar

(Lat. form of the Celtic name)

Pl. 47, fig. 11, 12.

Staminate cones oblong or ovoid, pistillate cones with the few scales opposite or rarely in 3's, fleshy, usually with a single ovule on each scale, fruiting cones roundish, berry-like, with 1-6 seeds; leaves sessile or whorled, awl-shaped or scale-like, usually of 2 kinds; flowers dioecious or sometimes monoecious; evergreen trees or shrubs.

1. Trees or tree-like, 10-40 ft. high
   a. Berry 1-seeded, 8-10 mm. wide
      (1) Berry with juicy, resinous flesh, 5-7 mm. wide — *J. monospérma*
      (2) Berry with dry, fibrous sweet flesh, 3-6 mm. long — *J. utahénsis*
   b. Berry 2-4-seeded, 4-5 mm. wide — *J. scopulórum*
2. Low shrubs, 1-5 ft. high, as a rule, forming dense patches
   a. Leaves all awl-shaped, prickly-pointed, 1-2 cm. long — *J. communis*
   b. Most of the leaves scale-like, appressed, in 4 rows — *J. sabina*

Pícea Link 1827 Spruce

(The Latin name, perhaps from *pix*, pitch)

Pl. 47, fig. 6, 7.

Staminate cones axillary, pistillate cones terminal, ovoid to oblong, ovules 2 on each scale, seeds winged, cones ovoid to oblong, hanging, the scales papery, persistent; leaves linear, 4-angled, scattered, single, on short bases; evergreen trees.

1. Cones 3-5 cm. long; twigs finely hairy; leaves only moderately stiff and sharp — *P. engelmánni*
2. Cones 5-10 cm. long; twigs usually smooth; leaves very stiff and spiny — *P. púngens*

PLATE 47

PINES—JOINT FIRS

PINE FAMILY

PINE

1. Pinus ponderosa: leaf cluster; cone x½
2. Pinus flexilis: leaf cluster; cone x½
3. Pinus edulis: leaf cluster; cone x½
4. Pinus aristata: leaf cluster; cone x½
5. Pinus murrayana: leaf cluster; cone x½

SPRUCE

6. Picea pungens: leaf and cone
7. Picea engelmanni: leaf and cone

FIR

8. Abies lasiocarpa: leaf and cone
9. Abies concolor: leaf and cone
10. Pseudotsuga mucronata: leaf and cone

JUNIPER, CEDAR

11. Juniperus communis: Juniper, Cedar
12. Juniperus scopulorum

JOINT FIR FAMILY

13. Ephedra trifurca: Joint Fir

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Pínus Linné 1753 Pine

(The Latin form of the Celtic name)

Pl. 47, fig. 1-5.

Staminate cones at the bases of new shoots, several-many in a cluster, pistillate cones solitary or few on year-old twigs, in the upper part of the tree, composed of scales with 2 ovules, borne on small bracts; cone woody, maturing the second autumn, seeds winged; leaves of 2 kinds, primary, linear or scale-like, deciduous, secondary, needle-like in clusters of 2-5, rarely single with a papery sheath at base; evergreen, monoecious trees.

1. Leaves 2-3 in a cluster, rarely single
   a. Leaves 1-3 in. long
      (1) Trunks 4-20 ft. high; leaves usually 2, sometimes 1, 1-2 in. long; cones 1-2 in. long; tips of the scales very broad and thick, without prickles — *P. edúlis*
      (2) Trunks 20-100 ft. high; leaves 2-3 in. long; cones 1-2 in. long; tips of the scales not broad and thick, prickly-pointed — *P. murrayána*
   b. Leaves 4-8 in. long, 2-3 in a cluster; cones 3-5 in. long; scales thickened, with a strong recurved prickle — *P. ponderósa*
2. Leaves 5 in a cluster
   a. Scales of the cone with a prickle; cones 2-4 in. long; leaves 2.5-4 cm. long; stems 10-40 ft. high — *P. aristáta*
   b. Scales of the cone without a prickle; cones 4-8 in. long; leaves 2-3 in. long; stems 20-60 ft. high — *P. flexilis*

Pseudotsúga Carriére 1867 Douglas Fir

(Gr. *pseudes*, false, Japanese, *tsuga*, hemlock)

Pl. 47, fig. 10.

Staminate cones axillary, pistillate cones terminal or axillary, oblong-ovoid, ovules 2 on each scale, seeds winged, cones ovoid-oblong, hanging, scales papery with long, 2-pointed and awned projecting bracts; leaves flattish, scattered, single; evergreen trees.

Trunks 30-100 ft. high; cones 1.5-4 in. long, fringed by the bracts; leaves 2-4 cm. long — *P. mucronáta*

GNETÁCEAE JOINT FIR FAMILY

Staminate flowers in catkins with solitary or clustered stamens in a papery, 2-toothed perianth, pistillate flower an erect ovule with a projecting, style-like appendage, enclosed in a perianth which is hardened and often thickened in fruit; flowers dioecious with persistent bracts in axillary clusters; shrubs or small trees mostly with jointed, opposite or clustered branches and opposite or whorled scale-like leaves.

EPHÉDRA Linné 1753 JOINT FIR

(Gr. *epi*, upon, *hedra*, seat)

Pl. 47, fig. 13.

Characters of the family.

1. Scales and branches opposite; bracts united; fruit 5-6 mm. long — *E. antisyphilítica*
2. Scales and branches in 3's; bracts hardly united; fruit 7-12 mm. long
   a. Scales short, 2-3 mm. long; fruit rough, 7-8 mm. long — *E. torreyána*
   b. Scales long, 6-12 mm. long; fruit smooth, 12 mm. long — *E. trifúrca*

GLOSSARY

Accessory Additional
Achene A dry one-seeded fruit
Acute Sharp-pointed
Alpine Above timber-line as a rule
Alternate With a single leaf at each level of attachment
Amphibious Growing in water or on land, usually in mud
Annual Lasting only one growing season
Anther The upper part of the stamen containing the pollen
Apex Tip or upper end
Apical At the tip
Appendage An addition or projection
Appressed Lying close to or against another part
Aquatic Growing in the water
Arctic Far northern
Aromatic Spicy, fragrant
Attenuate Drawn out gradually into a point
Awl-shaped More or less spine-like
Awn A slender bristle-like structure
Axil The angle between leaf and stem
Axillary Borne in the axil of a leaf
Axis The part of a stem or branch which bears leaves, flowers or flower parts
Banner The largest petal of a pea flower
Barbed Curved like a fish-hook
Basal At the base or lower end
Beak An elongated tapering structure
Beaked Bearing a beak
Bearded With hairs restricted more or less to a definite area
Berry A fleshy fruit with a thin skin or soft rind, the seeds embedded in pulp
Biconvex Both surfaces rounded or convex
Biennial Living two seasons and flowering once
Bipinnate With two sets of leaflets, primary and secondary
Blade The flat part of a leaf
Bract A reduced leaf associated with a flower or flower cluster
Bristle A stiff hair or prickle
Bulb A short round stem with fleshy scales, usually below ground
Bulbil A small bulb, usually above ground
Bulbous Like a bulb; bearing bulbs
Calyx The cup- or saucer-shaped outer part of the flower, made up of sepals and usually green
Capitate Head-like
Capsule A dry fruit consisting of two or more carpels or pistils and splitting when ripe
Carpel A simple pistil or the unit part of a compound pistil
Catkin A narrow hanging cluster of sessile flowers

Caudex The erect perennial base of a stem

Cell The cavity or chamber of an ovary

Chaff Small papery colorless scales between the flowers of an aster head

Channel A groove

Claw The narrowed lower part of a petal

Cleft Cut about halfway to the middle

Coherent United or clinging together

Compound Consisting of two or more similar parts united

Compound leaf Consisting of two or more leaflets on a common axis, the whole falling off together as a rule

Compressed Flattened

Concave Hollowed or curved inwards

Cone An elongated axis bearing stamens or ovule-bearing scales, as in the pine

Constricted Narrowed or pinched

Convex Curved outwards

Convolute Rolled up lengthwise

Cordate Heart-shaped

Corm A solid bulb-like organ, as in the crocus

Corolla The brightly colored part of most flowers, just within the green calyx and made up of petals

Corymb A flat-topped or convex flower cluster, blooming first at the edge

Corymbose Corymb-like; arranged as in a corymb

Creeping Growing along the ground

Crenate Scalloped; with rounded shallow teeth

Crest A toothed or fringed appendage

Crested With a crest

Cross-wall Partition

Crown A crown-like structure in the center of the flowers of milkweeds

Cylindric Oblong and round in section

Cyme A flower cluster blooming from the apex or middle first, usually somewhat flat

Cymose In a cyme; cyme-like

Deciduous Falling off, usually at the close of the season

Declined Bent down

Deflexed Bent down

Dentate Toothed

Diffuse Spreading

Digitate Resembling the fingers of a hand

Dilated Broadened

Dioecious Bearing pistils and stamens on different plants

Disk The base of a flower to which the parts are attached

Disk flowers One of the flowers in the central part of a head of flowers

Dissected Cut or divided into numerous parts

Divided Lobed nearly or quite to the base

Drupe A fleshy fruit with a pit or stone, such as the plum

Drupelet A small drupe
Eared With ear-like appendages
Ellipsoid Nearly elliptic
Elongated Long drawn-out
Entire Without teeth, lobes or divisions of any sort
Equitant Astride, as in the leaves of an Iris
Even-pinnate With all the leaflets paired
Exserted Projecting beyond the surrounding parts
Face The broader surface of spikelets, fruits, etc.
Fascicle A cluster, usually dense
Fascicled Borne in clusters
Felted With a dense felt-like coating of hairs
Fertile Bearing fruit; bearing pollen
Fibrous Consisting of fibres; woven in texture
Filament The stalk bearing the anther
Fleshy Thick and watery
Flower An axis bearing stamens or pistils or both, and usually also sepals and petals
Foliate With leaflets
Follicle A dry fruit of one carpel, splitting on one side only
Fruit A developing or ripened ovary; often also the axis containing the real fruits
Galea The hood-like upper lip of a corolla
Genus A group of related species, as the pine genus, the buttercup genus
Glabrous Without hairs
Gland A surface or structure which produces nectar, resin, oil, etc.; often a small appendage or projection
Glandular Bearing glands, or gland-like
Glaucous Covered with a bloom, a bluish or whitish wax coating
Globoid Nearly ball-like
Globose Ball-like
Glume One of the two small scales found at the base of the grass spikelet
Hastate Arrow-shaped but with the basal lobes diverging
Head A dense cluster of sessile flowers, such as that of the aster and sunflower
Herb A non-woody plant which dies annually, at least down to the ground
Herbaceous Herb-like, soft
Humus A rich vegetable mold
Hyaline Clear
Imbricated Overlapping like the shingles of a roof
Imperfect Referring to a flower which lacks either stamens or pistil
Included Not projecting beyond the other parts
Indehiscent Applied to fruits that do not split to let out the seeds
Inferior Applied to an organ situated below another one, especially to the ovary when below the other parts
Inflated Swollen

Inflexed Bent in

Interrupted Used of a flower cluster with large spaces between the parts

Intruded Grown inwards

Involucrate With an involucre

Involucre The group of leaves or scales just below a head of flowers, as in the sunflower, or sometimes below a single flower or cluster

Irregular Applied to a flower in which the petals are unlike

Keel The two fused lower petals of the flower of the pea family

Keeled Ridged like the keel of a boat

Lance-linear Narrowly lance-shaped

Lanceolate Lance-shaped

Lance-ovate Between lance-shaped and egg-shaped

Leaflet The division of a compound leaf

Lemma The outer and lower scale of a grass flower

Ligule A ribbon-shaped corolla, as in the rays of a sunflower head

Linear Line-like, long and narrow, with the sides nearly parallel

Linear-oblong Between line-like and oblong

Lip The upper and lower halves of an irregular corolla or calyx, as in the snapdragon; the irregular petal of an orchid

Lobe A division of a simple leaf

Lobed With the margin more or less cut or divided

Loment A pea-pod deeply constricted between the seeds

Margined With a flat border

Mealy Covered with a white meal

Median In the middle

Membranous Membrane-like, papery

Monoecious Bearing stamens and pistils in different flowers of the same plant

Mottled With large irregular spots

Nectary A pad of tissue, sack, spur or other structure producing or containing nectar

Nerve One of the lines or ridges running through a leaf

Netted-veined With veins running in various directions and connecting with each other

Neutral Without stamens or pistil

Nut A dry, one-seeded, non-splitting fruit with a stony shell or covering

Nutlet A small nut

Ob- A prefix meaning reversed or inverted

Obconic Reversed cone-shaped

Oblanceolate Reversed lance-shaped, with tip downward

Oblique Slanting, uneven

Oblong About twice as long as broad, the sides nearly parallel

Obovate Reversed egg-shaped, the tip downward

Obovoid More or less inverted egg-shaped

Obpyramidal Reversed pyramid-shaped

Obtuse Blunt

Odd-pinnate With an odd or unpaired leaflet at the tip of a compound leaf

Opposite Of leaves, directly across from each other; of flower parts, in front of

Orbicular Round

Ovary The part of a pistil containing ovules or seeds

Ovate, ovoid Egg-shaped

Ovule The young unfertilized seed, as found in the flower

Palate The upper more or less swollen throat of an irregular corolla

Palet The upper and inner scale of a grass flower

Palmate Like the fingers of the hands

Panicle A compound flower cluster, the lower branches longer and blooming first

Panicled In panicles

Papilla, papule A minute projection on the surface

Pappus The bristles, hairs, awns, etc. found on the tips of fruits of dandelions, sunflowers, asters, etc.

Parasite A plant growing upon and getting its nourishment from some other plant

Parietal On the wall

Pedicel The stalk of a single flower

Peduncle The stalk of a flower cluster or a solitary flower

Perennial Lasting from year to year

Perfect A flower having both stamens and pistils

Perfoliate Applied to leaves which are united around the stem

Perianth The term applied to the calyx and corolla when they are similar

Perigynium (pl. perigynia) The sack enclosing the ovary or fruit in the sedges

Persistent Remaining after blooming or fruiting

Petal The term applied to each part of a corolla

Petiole The stalk of a leaf

Pinnate With leaflets on both sides of a common stalk

Pinnatifid Pinnately cleft to the middle or beyond

Pistil The central part of the flower containing the young seeds and consisting of ovary, style and stigma, as a rule

Pistillate With pistils but without stamens

Plaited With two or more folds

Placenta (pl. placentae) Place of attachment for ovules

Plumose Plume-like or feathery

Pod A dry fruit of one carpel, splitting along two lines

Pollen The dust-like matter found in the anther

Pollinia Pollen-masses in orchids and milkweeds

Polygamo-monoecious The perfect and imperfect flowers on the same plant

Polygamous With both perfect and imperfect, staminate or pistilate flowers

Pome A fleshy fruit with a core, as the apple

Pore A small opening

Posterior At the back

Prickle A sharp needle-like outgrowth of the bark

Prickly With prickles

Prostrate Lying on the ground

Pungent Sharp

Pyramidal Shaped like a pyramid

Raceme A somewhat elongated axis bearing flowers with about equal pedicels

Racemose In a raceme

Ray One of the ribbon-like flowers of the composites or asters

Rayless Without rays

Receptacle The end of a flower stalk bearing the flower parts or in the asters bearing the flowers

Reflexed Bent down or back

Regular Having the members of each part alike in shape and size

Reniform Kidney-shaped

Resinous Bearing resin

Revolute With the margin rolled back

Rhomboid More or less diamond-shaped

Rootlet A small root

Rootstock An underground stem

Rosette One or more circles of leaves

Rudimentary Imperfect; beginning

Runner A slender stem lying on the ground and bearing one or more buds

Salver-form, salver-shaped With a slender tube, abruptly widened into a flat top

Samara A winged fruit, as in the maple

Saprophyte A plant living on dead matter and without green coloring

Segment A part or division

Sepal One of the outer circle of flower parts, usually green, a division of the calyx

Serrate With teeth as in a saw

Sessile Not stalked, seated

Sheath The part of a leaf or leaf base which clasps or encloses the stem

Shrub A woody plant, usually less than 20 feet tall

Simple Consisting of one part, not compound

Spadix A fleshy axis bearing sessile flowers

Spathe A leaf-like structure more or less enclosing a flower cluster

Spatulate Spoon-shaped, shaped like a spatula

Spike An elongated axis bearing sessile flowers

Spikelet A small few-flowered spike, the flower cluster of grasses and sedges

Spine A sharp woody outgrowth of the stem, a reduced leaf

Spur A hollow projection from a sepal or petal

Stamen The part of a flower which bears the pollen

Staminate With stamens but without pistils

Staminodium (pl. staminodia) An imperfect stamen
Stellate Star-shaped
Sterile Not producing seed; without pollen
Stigma The tip of the pistil which receives the pollen
Stipule A leaf-like part at the base of the stalk of the leaf
Stolon A stem which bends to the ground and takes root, or a runner
Strap-shaped Long and narrow in outline
Striate Marked with parallel lines
Style An extension of the pistil, bearing a stigma at its tip
Subglobose Nearly globose or head-like
Submersed, submerged Under water
Succulent Fleshy, watery
Superior Applied to a part placed above another part
Tendril A slender coiling holdfast
Terete Circular in cross-section
Terminal At the end
Ternate Of three leaflets
Ternately-compound The divisions in threes
Terrestrial On the ground, not water dwelling
Thallus A flat disk- or leaf-like body growing on the substratum
Throat Open upper portion of a united corolla
Trailing Creeping along the ground
Transversely Cross-wise
Truncate Cut off squarely
Tubercle Projection or wart
Tuberous With a tuber or with large swollen roots
Tubular Tube-like
Umbel A flower cluster with all the stalks arising from the same point
Utricle A one-seeded fruit splitting circularly
Valve One of the portions into which some dry fruits split
Verticillate Three or more in a circle
Whorl A group of three or more similar organs, as leaves, radiating from the place of attachment
Wing One of the two lateral petals of the pea flower

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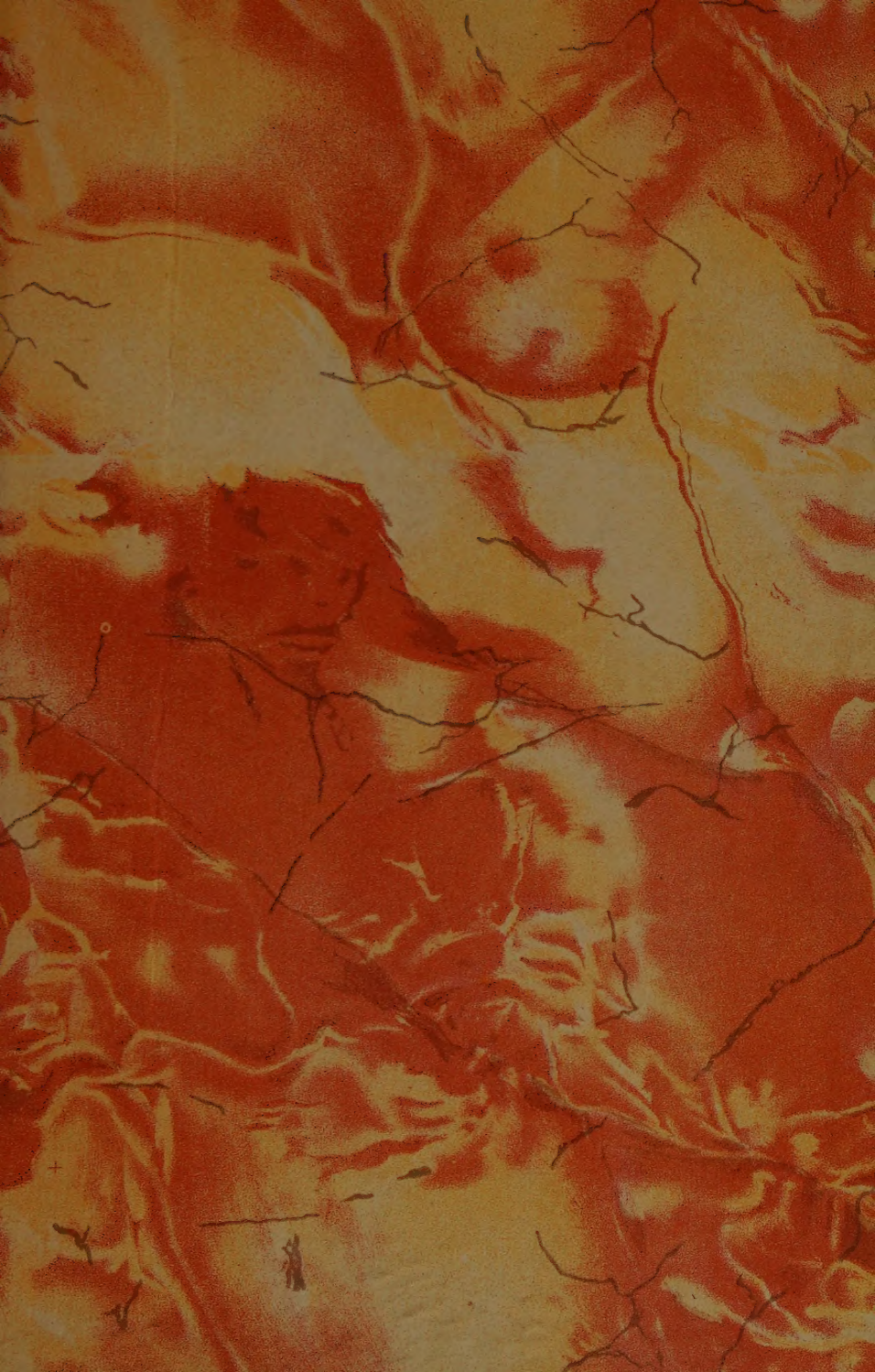
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